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# The influence of professional development and culture on data-driven decision making participation among senior and non-senior community college leadership.

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**The influence of professional development and culture on data-driven decision making  
participation among senior and non-senior community college leadership**

by

**Matthew J. Schmit**

A dissertation submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of

**DOCTOR OF PHILOSOPHY**

Major: Education (Educational Leadership)

Program of Study Committee:  
Lorenzo Baber, Major Professor  
Larry Ebbers  
Sharon Drake  
Yu Chen  
W. Wade Miller

The student author and the program of study committee are solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University

Ames, Iowa

2017

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## **DEDICATION**

This dissertation is dedicated to my family who has stuck with me through the less than desirable times. I could not have accomplished this without their support. Thank you for unconditional love throughout this journey.

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**ABSTRACT**

While data collection has increased at all levels of education in recent years, this is only part of the equation for institutions to make quality data-driven decisions. Advocates for data-driven-decision-making (DDDM) typically assume that the primary resource needed to use data effectively to inform practice is access to data. While it is understood that access to data is critical for data analysis to take place, a countervailing assumption is that everyone in a school system already has the requisite knowledge and skill sets to analyze the data and take action based on the findings (Nunnally, 2013). The National Research Council (1996) notes that, “far too often, more educational data are collected and analyzed than are used to make decisions or take action. A recent EDUCAUSE survey found that a majority of higher education institutions are collecting data, but are not using the data for predictive or actionable decisions (Bichsel, 2012). Data must be actionable and have utility for educators to use them to inform practice (Mandinach & Gummer, 2012). With the growing emphasis for educators to use data to inform their practice, little has been done to consider the means by which the educators can acquire the requisite data literacy skills (Mandinach, Friedman, & Gunner 2013).

The purpose of this study is to examine how variables such as data quality, infrastructure, professional development, and culture impact data-driven decision making participation among leaders at 15 Iowa community colleges. The quantitative findings from this study support the need for community colleges to invest time and resources into building a culture supportive of data-driven decision making. Based on the findings, implications for community college policy and practice and suggestions for future associated research are presented.

## **CHAPTER ONE. INTRODUCTION**

### **Introduction**

The use of data to drive organizational decisions has been prevalent in business and other fields long before education. The evolution of data into most education institutions started with accountability and transparency reporting requirements. While this reactive form of data use has served its purpose for these requirements, educational institutions are now looking at proactive ways to make data-driven-decision-making using data analytics. An inherent goal of learning analytics is to improve student outcomes and guide the decision-making process of faculty and administration in ways which leads to successfully accomplishing strategic institutional goals. Thus, learning analytics serve as a valuable tool to help guide educators' actions in ways that are "achievable within the capacity of the organization to absorb change and resource constraints" (Kavanaugh & Ashkanasy, 2006). Data from student information systems provides a transparent analysis and a means for shared understanding of the institution's successes and challenges (Campbell, DeBlois, & Oblinger, 2007). To fully collect and utilize data, institutions will need to not only create the infrastructure for data-driven decision-making (DDDM), but also ensure that the college stakeholders and key decision makers have high data literacy skills. This seems especially applicable for the executive leadership of institutions in an era of increased accountability, reduced resources, and pending shortage of experienced community college leadership. Additionally, the importance of developing leadership with high levels of data literacy and the ability to build a culture supportive of DDDM was recently endorsed by the American Association of Community College's in their Competencies for Community College Leaders (2012 & 2015).

## **DDDM and Higher Education**

There was a time in education when decisions were based on the best judgment of the people in authority. It was assumed that school and district leaders, as professionals in the field, had both the responsibility and right to make decisions about students, schools, and even about education more broadly (Earl and Fuller, 2003). So what is data-driven decision-making (DDDM) and what is its role in higher education? Picciano (2014) stated the use of data analysis to inform actions is referred to as data-drive decision-making. DDDM in education refers to teachers, principals, and administrators systematically collecting and analyzing various types of data, including input, process, outcome and satisfaction data, to guide a range of decisions to help improve the success of students and schools (Marsh, Pane, and Hamilton, 2006).

DDDM has a long history in higher education, but a large portion of that history has been driven by mandated reporting at the state or federal level. Analytics is widely viewed as important, but data use at most institutions is still limited to reporting (Bischel, 2012). State requirements to use outcome data in school improvement planning and site-based decision-making process dating back to the 1970s and 1980s (Massell, 2001). The broad implementation of standard-based accountability under the federal No Child Left Behind Act (NCLB) has presented new opportunities and incentives for data use in education providing schools and districts with additional data for analysis, as well as increasing the pressure on them to improve student test scores (Massell, 2001). Bishel's 2012 EDUCAUSE study provided evidence that most of these data are used to satisfy credentialing or reporting requirements rather than to address strategic questions, and much of the data collected are not used at all.

In recent years higher educational institutions have expanded the use of DDDM beyond required reporting and basic analytics. School leaders are no longer resident experts about their schools. Instead they are faced with the daunting task of anticipating the future and making conscious adaptations to their practices, in order to keep up and to be responsive to an ever-changing environment (Earl and Fullan, 2003). Higher education institutions, for the most part, are collecting more data than ever before. A broader range of departments and programs are applying data and analysis to decision making and planning in more domains than ever before (Bischel, 2012). As states, districts, and schools search for strategies to help raise student achievement and improve college readiness, they are using an increasingly wide range of data to inform decisions at all levels of the education system, from individual classrooms to the state department of education. (Gill, Borden, and Hallgren, 2014).

Many colleges and universities have demonstrated that analytics can help significantly advance an institution in such strategic areas as resource allocation, student success, and finance (Bichsel, 2012). The US Department of Education has spent over 600 million dollars in grants to state education agencies in recent years to upgrade their data systems so that decision makers can have higher quality data such as longitudinal student records linked to individual teachers as well as to pre and post K-12 school experiences (NCES, 2013). This increase investment of resources into DDDM has been very evident in most large public and private universities and K-12 institutions, but very little research has been conducted in relation to community colleges. One of the major purposes of this research is to look specifically at the DDDM operations (infrastructure, professional development and infrastructure) in community colleges.

Along with the increased educator interest in DDDM, has come increased attention from the research community to understand the process and effects of DDDM. There remain many

unanswered questions about the interpretation and use of data to inform decisions, and about the ultimate effects of the decisions and resulting actions on student achievement and other educational outcomes (Marsh, Pane, and Hamilton, 2006). Notions of DDDM in education are modeled on successful practices from industry and manufacturing, such as Total Quality Management, Organizational Learning and Continuous Improvement, which that organizational improvement is enhanced by responsiveness to various types of data, including input data such as material costs, process data such as production rates, outcome data such as defect rates, and satisfaction data including employee and customer opinions (Senge, 1990). Another major purpose of this study is to examine key factors that can help community college leadership effectively support DDDM efforts at their institutions.

### **AACC Competencies for Community College Leaders**

Development of the AACC Competencies for Community College Leaders started in 2003. The W.K. Kellogg Foundation awarded AACC a grant called Leading Forward to address the national need for community college leaders. AACC hosted a series of four leadership summits with different constituent groups to build consensus around key knowledge, values, and skills needed by community college leaders and to determine how to best develop and sustain leaders (AACC, 2017). In fall, 2004 AACC designed a survey to ensure that the critical areas of leadership competencies required by community college professionals had been addressed. The survey was distributed electronically in December 2004 to participants of the leadership summits and to members of the Leading Forward National Advisory Panel. From the survey, one hundred percent of the respondents noted that each of the six competencies was either "very" or "extremely" essential to the effective performance of a community college leader (AACC, 2017).

From this research, the first edition of AACC Competencies for Community College Leaders was created in 2005 and the revised second edition was established in 2013.

Community colleges, like many other American institutions, are experiencing a leadership gap as many current leaders retire. Moreover, the leadership skills now required have widened because of greater student diversity, advances in technology, accountability demands, and globalization (AACC, 2015). The American Association of Community Colleges (AACC) describes an effective community college leader as someone who improves the quality of the institution, protects the long-term health of the organization, promotes the success of all students, and sustains the community college mission, based on knowledge of the organization, its environment, and future trends. The AACC (2015) lists illustrations of this as:

- Assess, develop, implement, and evaluate strategies regularly to monitor and improve the quality of education and the long-term health of the organization.
- Use data-driven evidence and proven practices from internal and external stakeholders to solve problems, make decisions, and plan strategically.
- Use a systems perspective to assess and respond to the culture of the organization, to changing demographics, and to the economic, political, and public health needs of students and the community.
- Develop a positive environment that supports innovation, teamwork, and successful outcomes.
- Maintain and grow college personnel and fiscal resources and assets.
- Align organizational mission, structures, and resources with the college master plan.

With these illustrations of a community college leader in mind, the AACC (2013) developed 5 key competencies for leadership development: organizational strategy, institutional finance, research, fundraising, and resource management, communication, collaboration, and community college advocacy. Although DDDM can potentially play an important role in all 5 competencies, this study is focused primarily on the operational side of DDDM. The operational, or process related, AACC competency for leadership development is primarily in the competency of institutional finance, research, fundraising, and resource management.

According to the AACC Competencies for Community College Leaders (2013), emerging leaders should understand the institutional dashboard and how to interpret data to improve the student academic experience within your unit of the institution. Additionally, the AACC (2013) states that community colleges need to have an ongoing focus on process improvement for internal and external customers. If gaps exist in employees' technical proficiency, make requests for professional development so they can acquire the needed skills to better serve customers. Kezar, Bertram-Gallant & Lester (2011) defines staff development as: a set of programmatic efforts to offer opportunities for individuals to learn certain skills or knowledge related to issues associated with the change effort. Kezar (2011) describes development opportunities as bringing together people in a social way to learn new skills and gain new knowledge related to the unfolding changes.

The AACC takes it a couple steps further describing what skill experienced community college leadership should exhibit. According to the AACC Competencies for Community College Leaders (2013), CEOs in the first 3 years on the job should require an institutional dashboard and routinely discuss with key members of the staff those areas where the institutions is under performing and use of data mining and learning analytics to improve the academic

experience of students. Additionally, the AACC (2013) states CEOs who have been in their positions for more than 3 years should ensure accountability in reporting and support data mining and understand how to make informed decisions. Support operational decisions by managing information resources and ensuring the integrity and integration of reporting systems and databases.

### **The 15 Iowa Community Colleges**

The 15 Iowa community colleges in this study include: Des Moines Area Community College, Eastern Iowa Community College, Hawkeye Community College, Kirkwood Community College, Indian Hills Community College, Iowa Central Community College, Iowa Lakes Community College, Iowa Valley Community College, Iowa Western Community College, Northeast Iowa Community College, Northwest Iowa Community College, North Iowa Area Community College, Southeastern Community College, Southwestern Community College, and Western Iowa Tech Community College. Iowa's 15 community colleges enrollment was at 93,074 students per the most recent Iowa Department of Education report (2015). Registered semester hours for 2015 was at 823,306 between the 15 Iowa community colleges. Per the Iowa Department of Education (2015), the typical student is a white (83 percent) female (54 percent) from Iowa (91 percent) whose average age is 21.6 years, and enrolled part-time (60 percent) in a transfer-oriented college parallel program (68 percent). Approximately 30 percent of the students enrolled in at least one online course during the fall of 2015 and 31,446 of the students were jointly enrolled with another institution. Although overall fall enrollment has increased more than 10-fold since 1965, the number of full-time students as a percentage of total fall enrollments has steadily declined from over 90 percent in 1965 to about 40 percent in 2015.



### **Statement of the problem**

The use of data to inform practice in education has become an emerging field over the past decade (Mandinach & Gummer, 2013). Early education data focused on compliance. Collecting and reporting of data about students, budgets, and resource allocation were collected in response to state or federal program requirements for primarily accountability purposes (Mandanich & Jackson, 2012). More recently, the U.S. Department of Education is stressing the use of data and evidence at all levels. Data-driven decision making is an expectation whereby it is no longer accepted to rely on gut feelings, anecdotes, or solely experience (Maninach & Gummer, 2013). Secretary of Education, Arnie Duncan (2009), was recently quoted “I am a believer in the power of data to drive our decisions. Data gives us the roadmap to reform. It tells us where we are, where we need to go, and who is most at risk.”

Although data-driven decision making may be relatively new to education, many other disciplines have accomplished the task of integrating data use into their training and practice (Maninach & Gummer, 2013). In fields such as business and medicine, multiple, rich data sources are analyzed to identify patterns, predict outcomes, and yield more informed decisions (Hersh, 2002). Learning analytics, in many ways, is “big data,” applied to education. The term owes its beginnings to data mining efforts in the commercial sector that used analysis of consumer activities to identify consumer trends (Johnson, Adams Becker, Cummins, Estrada, Freeman, & Ludgate, 2013). High expectations exist for learning analytics to provide new insights into educational practices and ways to improve teaching, learning, and decision-making (Siemens and Gasevic, 2012).

In response to potential shortage of experienced community college executive leadership the American Association of Community Colleges developed the “AACC Competencies for

Community College Leaders”. According to the AACC (2013), emerging leaders should understand the institutional dashboard and how to interpret data to improve the student academic experience within your unit of the institution. The AACC (2013) also adds that new CEOs within the first 3 years on the job should require an institutional dashboard and routinely discuss with key members of the staff those areas where the institution is under- performing. Design strategies to ensure that the institution is moving in a positive direction to overcome those cautionary areas and use of data mining and learning analytics to improve the academic experience for students. For CEOs with more than 3 years in their position, the AACC (2013) state CEOs need to ensure accountability in reporting. Support data mining and understand how to use data to make informed decisions. Support operational decisions by managing information resources and ensuring the integrity and integration of reporting systems and databases.

### **Purpose of the Study**

This study aimed at better understanding the 15 Iowa community college’s culture, infrastructure, and professional development regarding DDDM and explores potential recommendations for community college leaders looking to maximize the use of DDDM at their institutions. This study will examine the responses to DDDM variables of perceived quality of data, culture, infrastructure, and professional development and ultimately how these variables impact DDDM involvement amongst community college leaders. It is the intention of this research group to provide community colleges with information that will determine current levels of data literacy and provide information to assist community college leaders to make decisions that will build the culture, infrastructure, and professional development necessary to make critical DDDM decisions.

### **Research Questions**

1. What are the demographic and background characteristics of community college leadership in the community college DDDM study?
2. Are there any statistically significant differences in personal involvement of DDDM between senior and non-senior administrators?
3. Are there any statistically significant differences in perceived institutional prioritization of DDDM between senior administrative and non-senior administrative?
4. Are there inter-correlations between variables in the study related to predicting leadership personal involvement in DDDM?
5. What are the variables that can help predict the level of personal involvement in institutional DDDM?

### **Methodological Approach**

This study adopted a quantitative research methodology. The Community College Data Driven Decision Making (DDDM) survey was used to measure community college leaderships' DDDM participation levels and other related variables. Based on current literature covered in my literature review, this study examined critical factors, including quality of data, infrastructure, culture, professional development, and leadership level and ultimately how they influence participation levels of community college leadership. To answer the research questions previously listed, types of analysis in this research included descriptive analysis, comparative analysis, factor analysis, and regression analysis.

## **Theoretical Framework**

The theoretical framework of this study consists of four elements. The first, Kezar's organizational change theory addresses the unprecedented period of change and reform in higher education. In Kezar's (2001) organizational change theory, six main categories of change theories' exist throughout a multidisciplinary literature including biological, teleological, political, lifecycle, social cognition, and cultural. Kezar also focuses on key factors unique to higher education institutions that affect organizational change. These features include: interdependent organization, relatively independent of environment, unique culture of academy, institutional status, values-driven, multiple power and authority structures, loosely coupled system, organized anarchical decision-making, professional and administrative values, shared governance, employee commitment and tenure, goal ambiguity, and image/success. Kezar (2001) stresses that without a solid grasp of organizational context, campus leaders may attempt to implement change process inconsistent with the nature of their institutions. From examining the various change theories and key factors of higher education Kezar provides us with "research-based principles of change" that guide higher education leadership through the institutional change process. Kezar's organization change theory in higher education is meant to be the foundation for community college leaders to understand the unique environment of higher education and use DDDM for transformational change.

In the second framework utilized in this study was the DDDM theory of action and organizational supports which involve three sequential steps that together could produce improved student outcomes (Gill, Borden, & Hallgren, 2014). These three steps include assemble high-quality raw data, conduct analysis that ensure resulting data are relevant and

diagnostic, and use relevant and diagnostic data to inform instructional and operational decisions. This sequential process of this framework helped guide this study.

The third element is Ikemoto and Marsh's (2007) framework examines the complexity of data and recognizes that data applicable to one stakeholder may not be relevant to other stakeholders. Their framework incorporates the complexities of educators making decisions in real-world settings and argues that DDDM can vary along two continua: the type of data used and the nature of data analysis and decision making. These two continua form four quadrants that a DDDM can fall into depending on the level of data and analysis & decision making complexity. The four quadrants are labeled "basic" (quadrant 1), "analysis-focused" (quadrant 2), "data-focused" (quadrant 3), and "inquiry-focused" (quadrant 4). For example, basic DDDM entails using simple data and simple analysis procedures whereas inquiry-focused DDDM involves using more complex data and complex analysis and decision making complexity. Ikemoto and Marsh (2007) do not promote one quadrant as being better than the other, but instead explain how factors such as accessibility and timeliness of data, perceived validity of data, staff capacity and support, time, partnerships with external organizations, tools, organizational culture and leadership, and federal, state, and local policy context enable and constrain DDDM in higher education.

The final framework by Mandanich, Honey, and Light's (2006) describing DDDM describes a multi-step process for conducting DDDMs. The first step consists of collecting and organizing raw data. The second step of the process includes using the raw data combined with an understanding of the situation through a process of analysis and summarization to yield information. Next, the data users convert information into actionable knowledge by using their judgment to prioritize information and weigh the relative merit of possible solutions. Finally, a

decision is made, implemented, and new data is collected to assess the effectiveness of the previous actions. This study focused on this framework's process of DDDM leading to actionable knowledge and the continuous improvement cycle of starting the DDDM process again, often based off the data in the previous cycle.

### **Significance of the Study**

Considerable research has been completed regarding data literacy in the K-12 educational systems, but minimal research has been conducted regarding data literacy in higher education and especially in regards to community colleges. As community college leaders face traditional and new, unforeseen challenges, it will be critical for them to collect accurate data, have the ability to interpret the information, and ultimately make data-driven decisions that produce the desired results. Through investigating community college leadership, this study intends to fill the literature gap on community college data literacy. This study will examine how existing community college data, DDDM infrastructure, DDDM professional development, DDDM culture, and institutional leadership impact participation levels of community college leadership. Additionally, this study will examine how the results align with the *AACC's Competencies for Community College Leaders*, thus pushing forward the ultimate goal of using DDDM to positively impact student success. Finally, it is the intent of this study to provide future community college leadership with statistically significant evidence that will serve as guide to increase the institutional participation of DDDM, create an institutional culture that promotes effective DDM use and ultimately increase student success rates.

### **Definition of Terms**

*AACC.* American Association of Community Colleges

*Analytics.* Analytics is the use of data, statistical analysis, and explanatory and predictive models to gain insights and act on complex issues (Bischel, 2012).

*Community college leadership.* In this study, community college leadership is defined by position/rank at participating community college. All faculty and staff with management responsibilities were included with administration.

*Culture.* The deeply embedded patterns of organizational behavior and shared values, assumptions, beliefs, or ideologies that members have about their organization or its work (Peterson & Spencer, 1991).

*Data.* Any information that helps educators know more about their students' needs and which can be codified in some manner to facilitate systematic analysis (Wayman, 2013).

*Data driven decision-making (DDDM).* The systematic collection, analysis, examination, and interpretation of data to inform practice and policy in educational settings (Mandinach, 2012).

*Professional development.* A set of programmatic efforts to offer opportunities for individuals to learn certain skills or knowledge related to issues associated with the change effort (Kezar Bertram-Gallant & Lester, 2011).

### **Organization of Study**

The main purpose of this study was to examine the influence of infrastructure, culture and professional development on participation levels of community college leadership data-driven decision making (DDDM). Additionally, this study will examine leadership's perception

of data quality at their institutions and how that may impact participation levels of DDDM.

Within this study there is also a specific focus on the differences of DDDM between senior and non-senior community college leadership and their perception of existing institutional data and the prioritization of DDDM at their current institution. The responses of the participating community college leaders will be examined with the intent of providing valuable information regarding DDDM to future community college leadership.

In the upcoming chapters this study will present a current review of the literature, methodology used in this study, results of the study, and finally the corresponding discussion and implications for practice. Chapter Two provides an extensive literature review on the history of DDDM in the field of higher education, important qualities of data for effectiveness, and previous community college leadership studies on the infrastructure, professional development and culture of DDDM. Chapter Three will review the methodological approaches and resources used in this study including the research design, variables in the study, type of data analysis utilized, associated ethical considerations, and expected limitations. Chapter Four will present the main findings of the study included descriptive analysis of the community college leadership in the study, comparative analysis of senior and non-senior leadership in relation to DDDM participation, DDDM institutional importance, and perceptions of data quality, factor analysis of key institutional DDDM constructs, and multiple regression analysis to predict key indicators of leadership DDDM participation. Finally, in Chapter Five, discussion on the findings will be discussed in relation to the literature review and implications/recommendations for practice and future research will be presented.



## **CHAPTER 2.LITERATURE REVIEW**

Chapter two of this study includes a review of existing literature regarding DDDM in higher education. The major components of this chapter are: 1.) higher education leadership and DDDM, 2.) organizational change in higher education, 3.) factors that influence the use of data, 4.) DDDM infrastructure, 5. ) DDDM professional development, and 6.) DDDM culture.

### **Higher Education Leadership and DDDM**

The AACC's competencies regarding data literacy for community college leadership are supported in recent literature. A critical synthesis of research literature on the process of organizational change at the institutional level is needed because higher education is being asked to be responsive to an ever-changing environment (Kezar, 2001). In Supovitz and Klein's (2003) study on utilizing data to improve student learning they state:

The fingerprints of strong leadership are all over the data activities in the schools.

Virtually every example of innovative data use in this study came from the initiative and enterprise of an individual who had the vision and persistence to turn a powerful idea into action. The culture and leadership within a school or district also influenced patterns of data use across sites.

Gill, Borden, and Hallgren (2014) conclude that administrators with strong commitments to DDDM and norms of openness and collaboration often foster data use. Research bears this out: Examples of effective data use are consistently associated with leaders who have ample capacity for data use in the areas of technical skill and process knowledge and who can model constructive data use for teachers (Park and Datnow, 2009).

In addition to the importance of leadership leading the charge for an effective culture of DDDM, it is important to note that DDDM is often influenced by many factors (real or perceived) including relevance, validity, and complexity of data. For each level of decision maker, the relevance of data may depend on whether they are related to students, staff, or programs; how frequently the data are updated and delivered; and the level of detail or aggregation. Teachers, for example, typically need student data that are fine-grained—at the level of individual students and specific skills—and rapidly delivered if they are to use the data to adjust their instruction (Gill, Borden, and Hallgren, 2014). Ikemoto and Marsh’s (2007) framework for simple versus complex DDDM builds upon the previous framework to incorporate the complexities of educators making decisions in real-world settings. Their framework argues that:

DDDM can vary along two continua: the type of data used and the nature of data analysis and decision-making. These two continua form four quadrants that a DDDM can fall into depending on the level of data and analysis & decision making complexity. The four quadrants are labeled “basic” (quadrant 1), “analysis-focused” (quadrant 2), “data-focused” (quadrant 3), and “inquiry-focused” (quadrant 4). For example, basic DDDM entails using simple data and simple analysis procedures whereas inquiry-focused DDDM involves using more complex data and complex analysis and decision-making complexity.

Ikemoto and Marsh (2007) do not promote one quadrant as being better than the other, but instead explain how factors such as accessibility and timeliness of data, perceived validity of data, staff capacity and support, time, partnerships with external organizations, tools,

organizational culture and leadership, and federal, state, and local policy context enable and constrain DDDM in higher education.

### **Organizational Change in Higher Education**

Understanding and effectively leading institutional change are central concerns for most of today's academic leaders, be they presidents, provosts, deans, student affairs professionals, or faculty. Institutional change has become an expected session at national association meetings and a familiar topic within the corridors of most, if not all, campus buildings (Kezar, 2001). It has been noted that other sectors are ahead of higher education in terms of strategic DDDM use to obtain organizational goals. If current and future leadership want to be at the forefront of building an effective DDDM culture, they change they must understand the unique background of higher education. There are two main reasons this is necessary for developing a distinctive approach to higher education: (1) overlooking these factors may result in mistakes in analysis and strategy, and (2) using concepts foreign to the values of the academy will most likely fail to engage people who must bring about the change (Kezar, 2001)

In order to develop a distinctive model, the following unique features of higher education institutions need to be taken into account (Kezar, 2001). Most higher education institutions are an interdependent organization. Alpert, for example, suggests that higher education institutions need to realize that they are not fully autonomous and cannot set a course of action independent of other institutions (1991). Collaboration with accreditation agencies, state/federal government, unions, and private foundations are examples of organizations with external influence on higher education institutions. The interdependent nature of higher education will most likely result in institutions receiving multiple and perhaps mixed messages related to change (Kezar, 2001).

Higher education institutions are typically relatively independent of environment. Higher education has a history of a great degree of autonomy because no national ministry of higher education evolved and states have a tradition of allowing higher education its independence, with minimal local expectations (Cohen, 1998). Berdhal (1991) notes that since World War II, pieces of autonomy have been lost here and there on the road toward a system of mass access to higher education. But historical influences have created structures and cultures that are relatively autonomous. For many higher education professionals, external pressures may seem overwhelming relative to those of earlier time periods, yet higher education experiences much less scrutiny and more freedom than many enterprises.

A unique culture of the academy exists in higher education. Although there is some disagreement over the exact character or nature of the academic culture, it is clearly political yet consensus-oriented (Kezar, 2001). Faculty professional values (collegium) and administrative values (bureaucratic) are both present, there is a fair degree of clashing of different value sets (political), and ambiguity and unclear structures exist (anarchical). In terms of change, the collegial orientation of higher education would suggest that a shared and inclusive process will likely be successful. In addition, political approaches are likely to be prevalent.

Higher education is a distinctive form of organization called an institution. Some of the defining characteristics of institutions are that they serve longstanding missions; are closely tied to ongoing societal needs; have set norms and socialization processes based on the mission and needs of society; and have norms that are tied closely to individual's identities (Czarniawska and Sevón, 1996). Because these organizations have long-standing missions, they are less likely to change — and if change occurs, it is likely to happen as a result of extensive debate among stakeholders, as these organizations serve so many different societal needs (Kezar, 2001)

Higher education is values-driven, both complex and contrasting. Although all organizations have belief systems that guide them, colleges and universities are noted for the complex and contrasting beliefs system that guide and shape their culture and structures (Clark, 1983). Additionally, this trend toward fewer shared values will become increasingly complex as individuals from diverse backgrounds enter the professoriate and join the ranks of administration and faculty.

Higher education has multiple power and authority structures. In higher education, there are not only distinctive power processes used among faculty and administrators, but there are multiple levels of power and authority among trustees, the state, and the occasional charismatic individual. Burton Clark (1991) identified four kinds of competing authority systems: academic authority, enterprise-based authority, system-based authority, and charisma.

Higher education has loosely coupled systems. Large-scale change will be difficult to achieve in higher education. Due to the level of independence within the system, change is likely to occur in pockets, continuously; independence encourages opportunistic adaptation to local circumstances (Hearn, 1996). Although most campuses are loosely coupled, some smaller colleges are able to obtain more synergy between efforts and balance centralized and decentralized activities. Also, community colleges have some centralized controls in place, developing a less loosely coupled system.

Organized anarchical decision-making is prevalent in higher education. There is ambiguity about who holds authority in higher education institutions; even though trustees hold the formal authority, over the years, faculty and administrators have developed authority for the organization. Power is ambiguous because, in a collegial system, it is unacceptable to visibly

display power. Although some sources of power are clear in the administrative area, this is less true for other parts of the system. Committees, task forces, and other collective groups are involved with much of the institutional policy- and decision making. This anarchical process makes rapid or large-scale change difficult (Kezar, 2001).

There are differences in professional and administrative values in higher education. Administrative power is based on hierarchy; it values bureaucratic norms and structure, power and influence, rationality, and control and coordination of activities. In contrast, professional authority is based on knowledge and the values system emphasizes collegiality, dialogue, shared power, autonomy, and peer review.

Shared governance often impacts change in higher education. Perhaps no other feature has been more demonized in the last decade or slowing down change than shared governance, as a result of the inherently slow pace of consensus-building and collective decision-making (Johnstone, Dye, and Johnson, 1998). Yet this feature characterizes the very nature of the institution and the professional orientation of faculty. Some higher education institutions are trying to move away from their traditional dependence on shared governance, citing the need for rapid change (Johnstone, Dye, and Johnson, 1998).

Employee commitment and tenure in higher education exceeds most other sectors. There are few other organizations with this type of employee stability. In addition, even part-time faculty and contract faculty, noted as a rising percentage of the faculty, also tend to stay at institutions for a long period of time (Finklestein, Seal, and Schuster, 1999). Administrative staff has more turnover, but compared to administrative staff in some other sectors, their tenure is lengthy. It is also important to note that recent literature predicts major turnover at the executive

level. For example, in 2015 269 community college presidencies turned over, which means nearly one in four of the country's 1,132 community colleges experienced some type of transition (Smith, 2016).

Higher Education often struggles with goal ambiguity. In describing the anarchical structure, goal ambiguity was noted as a defining characteristic of higher education institutions (Hearn, 1996). Change efforts often assume that a clear vision can be established and tied to institutional goals. Yet, since these goals are so unclear themselves, the typical planning process associated with some theories of change might be problematic (Kezar, 2001)

The definition of image and success in higher education sometime differ. Image is often tied to identity; to change an image may require a change in identity. The more that people interact and participate in decision-making, the greater their identification with and connection to the organization's image (Gioia and Thomas, 1996). Some scholars argue that the emphasis on resources and prestige (essentially image) to measure success is problematic; they advocate that student development be used instead (Astin, 1993). Kezar (2001) concludes that this attempt to move away from image and toward learning outcomes as the measure of success could determine some bottom-line aspects that can be used to define effectiveness.

In light of these distinctive organizational features, higher education institutions would seem to be best interpreted through cultural, social-cognition, and political models. The need for cultural models seems clear from the embeddedness of members who create and reproduce the history and values, stable nature of employment, strong organizational identification of members, emphasis on values, and the various cultures of the academy. These 13 unique aspects of higher education presented by Kezar are critical for community college leadership to consider as they

initiate transformational change, including creating a culture conducive to strategic institutional DDDM.

### **Factors That Influence the Use of Data**

Recent literature would suggest that many higher education leaders have abundant amounts of data. Data is becoming more abundant at the state, district, and school levels – some even suggest that educators are “drowning” in too much data (Celio and Harvey, 2005). According to Gill, Borden, and Hallgren, (2014) meaningful use of data begins with who will access, analyze, or review the data and for what purpose. In this data-rich environment, education decision makers have access to a wealth of information about students, teachers, administrators, organizational finances, operations, and the communities that educational institutions serve. Achievement test data, in particular, play a prominent role in federal and state accountability policies. Implicit in these policies and others is a belief that data are important sources of information to guide all levels of the education system and to hold individuals and groups accountable. (Marsh, Pane, and Hamilton, 2006). These data, however, have limited use—and could possibly be detrimental—if decision makers do not understand the benefits and limitations of data, the types of data relevant for the decisions they are confronted with, and how data can be appropriately used for decision making (Gill, Borden, and Hallgren, 2014). A majority of the literature on DDDM in higher education indicated that data is prevalent in most institutions. So why is effective use of DDDM limited to mandated reporting at many higher educational institutions? The literature suggests the following data characteristics to be vital for leaders and institutions developing raw data into actionable knowledge.



Not surprisingly, the timeliness of data is extremely important to leaders as they ponder strategic decisions. Additionally, the required timeliness of data varies depending on the role of the person using the data. Data systems are not always user-friendly and some provide access more to state-level annual exam data than to the day-to-day data teachers say they want and need (Wayman and Stringfield, 2016). Decision makers at higher levels of the system typically need data that are aggregated at larger units of analysis (teachers rather than students, schools rather than teachers, and so on), and their decisions often do not require data that are updated as rapidly and frequently. For example, decisions about human capital or accountability regimes are not made on a daily basis and therefore do not require data that are updated daily. Higher-level decision makers are likely to need a wider range of types of data on programs and staff as well as on students (Gill, Borden, and Hallgren, 2014).

The quality of data, real or perceived, is critical to building a culture of DDDM. Many educators questioned the validity of some data, such as whether test scores accurately reflect students' knowledge, whether students take the tests seriously, whether tests are aligned with curriculum, or whether satisfaction data derived from surveys with low response rates accurately measure opinions (Gill, Borden, and Hallgren, 2014). Reliable data are measures that do not have large random variation when they are measured repeatedly. Unreliable data lack stability: they involve so much random variation (or statistical "noise") that they are essentially interpretable (Gill, Borden, and Hallgren, 2014). In Bischels' (2012) EDUCAUSE study: Between one-quarter and one-third of survey participants reported misuse of data or inaccurate data as a large or major concern about analytics. Without the availability of high-quality data and perhaps technical assistance, data may become misinformation or lead to invalid inferences.

As indicated in the Gill, Borden and Hallgren's (2014) theory of action, in order to guide the improvement of practice—and ultimately the improvement of student outcomes—data must be relevant to the practice of the particular decision maker and diagnostic for the issue at hand. Irrelevant data will not be used, and non-diagnostic data might be used inappropriately. Even when data are reliable, they may not be valid for informing the decision at hand. Data that are improperly analyzed or interpreted can lead to invalid inferences that are biased, that is, that cause decision makers to draw exactly the wrong conclusions. Using student achievement data to assess the effectiveness of teachers, principals, schools, or interventions is especially susceptible to biased (invalid) inference because student achievement can be affected by many factors that are unrelated to the effectiveness of staff, schools, or programs (Gill, Borden, and Hallgren, 2014). The relevance of the data to the decision maker and the decision at hand is not sufficient to ensure that the data will move the decision maker in a productive direction. Student achievement data, for example, are certainly relevant to assessing the performance of the school, but if not analyzed carefully, they could lead to bad inferences about the school's performance and bad decisions about how to improve the school's performance. The same data can be diagnostic for some decisions and not for others (Gill, Borden, and Hallgren, 2014).

In sum, being driven by data requires much more than the existence of a data infrastructure and the accessibility of the data. It also requires careful attention to ensure the timeliness, quality, reliability, and relevance of data for each decision and an understanding that data applicable to one issue may not be appropriate for another. Otherwise, there is a high risk that decision maker will either drive in the wrong direction or drown in the data.

### **DDDM Infrastructure**

In the last decade, districts and schools have developed or implemented data systems capable of tracking the progress of individual students, teachers, and administrators from year to year or have formed data warehouses that allow them to combine data, such as teacher background and student test scores, across distinct databases and systems (Data Quality Campaign 2013). The types of data that are collected, analysis that are performed, and decisions that are made will vary across levels of educational system: the classroom, school, and district. Additionally, the conditions at all of these levels are likely to influence the nature of the DDDM process. For example, at a particular level of the system, the accuracy and accessibility of data and technical support or training can affect educators' ability to turn data into valid information and actionable knowledge (Marsh, Pane, and Hamilton, 2006).

The creation and improvement of data systems are essential to an institution's ability to effectively collect, transfer, and manipulate information. Data infrastructure development includes the replacement or improvement of technical hardware such as servers, computers, peripheral devices, and Internet connections (Gill, Borden, and Hallgren, 2014). Another data issue frequently mentioned in the literature was the lack of technical tools to share data. In Bischel's 2012 study:

Data need to be "de-siloed." Participants noted that many departments were reluctant or unwilling to share data necessary for analytics. Most agreed that it is necessary for senior leadership to institute policies that encourage the sharing, standardization, and federation of data, balancing needs for security with needs for access.

Gill, Borden, and Hallgren (2014) suggest establishing linkages between distinct databases—for example, linking student and teacher data, linking financial data with program performance data—facilitates analyses that require connections across data types. Leaders can increase the likelihood that data is effectively utilized by promoting data sharing, thus encouraging staff to openly discuss and reflect on their data. This includes requiring or encouraging regular interaction between departments and allocating the necessary time and resources for data activities.

Lack of time to collect, analyze, synthesize, and interpret data has also been a common barrier in previous research on DDDM in education. While online data systems and software may have reduced time needed to summarize, display, and even run basic quantitative data, deciding how to act on these results required time educators often lacked. Over commitment on the part of both IR and IT professionals often leads to reports that merely satisfy accountability requirements rather than address an institution's strategic initiatives (Bischel, 2012). Another concern was an inability to direct existing resources to analytics. IR participants stated that analysts (business or IR professionals who would likely lead analytics initiatives) are too busy with reporting to think about analytics, and they noted that anticipated increases in accountability could make this situation worse (Bischel, 2012). Gill, Borden, and Hallgren (2014) recommend creating low-burden data collection mechanisms—for example, developing standardized procedures for the collection and storage of student achievement and behavioral data that are integrated with the existing work of teachers and other staff rather than imposing an additional burden—improves data quality.

The hiring and training of additional staff—particularly analysts—was viewed as a major challenge. It was clear that many participants were overwhelmed at the idea of beginning an

analytics program given their current workloads (Bischel, 2012). Similarly, certifying and monitoring those who collect data, including school staff, support data quality. Adjusting data access and management practices to ensure timely delivery of data to decision makers enhances their ability to make use of the data (Gill, Borden, and Hallgren, 2014). Where analytics is concerned, investment is the area in which higher education institutions are making the least progress. Institutions that view analytics as an investment rather than an expense are making greater progress with analytics initiatives. Institutions should focus their investments on expertise, process, and policies before acquiring new tools or collecting additional data (Bischel, 2012).

### **DDDM Professional Development**

A review of the literature supports the need for professional development in regards to data literacy. In describing both the benefits and hardships of effectively using data, research is clear that leadership plays a critical role (Wayman & Stringfield, 2006). School leaders are no longer resident experts about their schools. Instead, they are faced with the daunting task of anticipating the future and making conscious adaptations to their practices, in order to keep up and to be responsive to a never-changing environment (Earl & Fullan, 2003). The rapid shift from no data to mountains of data has had a serious effect on how leaders communicate with their constituents, what they communicate and what evidence they draw on to support their statements (Earl & Fullan, 2003). Regarding data literacy in the K-12 education system, Wyman (2013) stated leaders at district and school levels have great influence over how data are used and whether that use is successful. The literature supports the basis that educational leaders must have excellent data literacy aptitude to make effective data-drive decisions and also support a culture of data literacy for faculty and staff to make decisions of their own. Kezar (2002) also

wrote staff development was critical to fostering knowledge about being student centered as well as developing collaborative leadership. In order for the potential benefits of learning analytics to be realized, it is essential that educators, students, and administration have a foundation on which to enact change (Long and Siemens, 2011).

While data collection has increased at all levels of education in recent years, this is only part of the equation for institutions to make quality data-driven decisions. Advocates for data-driven-decision-making (DDDM) typically assume that the primary resource needed to use data effectively to inform practice is access to data. While it is understood that access to data is critical for data analysis to take place, a countervailing assumption is that everyone in a school system already has the requisite knowledge and skill sets to analyze the data and take action based on the findings (Nunnally, 2013). The National Research Council (1996) notes that, “far too often, more educational data are collected and analyzed than are used to make decisions or take action. A recent EDUCAUSE survey found that a majority of higher education institutions are collecting data, but are not using the data for predictive or actionable decisions (Bichsel, 2012). Data must be actionable and have utility for educators to use them to inform practice (Mandinach & Gummer, 2012). With the growing emphasis for educators to use data to inform their practice, little has been done to consider the means by which the educators can acquire the requisite data literacy skills (Mandinach, Friedman, & Gunner 2013).

One common type of professional support is workshops or training on how to examine test data – yet the content and perceived quality of this support varies. In a study conducted by Marsh, Pane, and Hamilton (2006) on a K-12 school district:

One district invested significant resources into developing computer-based template and training to help school staff analyze data to develop their school improvement plan (SIP). When compared to two other districts in the study, teachers in this district demonstrated a higher level of awareness about the content of the SIP and what they were doing to implement it. Staff described these plans as meaningful documents that truly guide their work, but acknowledged that the process is more labor-intensive than it should be. Staffs in the other two districts were more likely to characterize the plans as compliance documents.

Staff capacity is a critical enabler of DDDM and school personnel often lack adequate skills and knowledge to formulate questions, select indicators, interpret results, and develop solutions (Marsh, Pane, and Hamilton, 2006). Providing training to staff at all levels increases their individual capacity to access and use data. Important areas of training might include implementation of data driven decision making practices, how to access and analyze data, using data to change instructional practice, and data management and security (Gill, Borden, and Hallgren, 2014).

Another common source of support comes from leaders on school campuses, although the quality and capacity of leadership clearly impact the effectiveness of this support. Creating in-house technical assistance systems provides additional support to help decision makers make use of data. These systems might include technical experts available to schools to support data system use or instructional coaches available to teachers to support the understanding and improvement of their professional practice. This also includes requiring instructional coaches to explicitly incorporate data use into their teacher training and technical assistance activities (Gill, Borden, and Hallgren, 2014).

Two other less prevalent means of support were technology and partnerships with external organizations. Establishing external technical assistance contracts for activities that are beyond an organization's internal capacity may improve the outputs of those activities. Depending upon an institution's capacity, this might include working with an external contractor to conduct value-added analyses or to improve a district's electronic data systems (Gill, Borden, and Hallgren, 2014).

Improving the accessibility of data enhances the ability of educators at all levels to access and use data in a timely manner. This includes providing web access to diagnostic or benchmark assessments; ensuring that staff at all levels are presented with data in forms that are most likely to be relevant and diagnostic to their work; and instituting other methods of improving teacher, specialist, or administrator access to relevant information (Gill, Borden, and Hallgren, 2014). One of the major barriers to analytics in higher education is cost. Many institutions view analytics as an expensive endeavor rather than as an investment. Much of the concern around affordability centers on the perceived need for expensive tools or data collection methods. What is needed most, however, is investment in analytics professionals who can contribute to the entire process, from defining the key questions to developing data models to designing and delivering alerts, dashboards, recommendations, and reports (Bischel, 2012).

### **DDDM Culture**

Few studies have tried to link DDDM to changes in school culture or performance, most focus on implementation (Wayman and Stringfield, 2005). Bischel's 2012 study observed:

A considerable amount of time was spent discussing how an institution's culture can be a barrier to a successful analytics program. Many institutions have administrators, faculty,



and staff who fear or mistrust institutional data, measurement, analysis, reporting, and change. One-third of survey respondents were concerned that higher education doesn't know how to use data to make decisions. Analytics is an interest or a major priority for most colleges and universities, and most survey respondents believe that the importance of analytics for the success of higher education is growing. However, widespread analytics use is limited mainly to the areas of enrollment management, student progress, and resource optimization.

Jenkins and Kerrigan's (2008) findings on Achieve the Dream data suggest that leadership commitment and a data-oriented approach to institutional management may not be sufficient to encourage faculty and administrators to become more data-oriented in practice. This implies that the notion of broad engagement in the process of analyzing student data is particularly important, especially for department and division chairs at the college. Effective data use gains traction when teachers, administrators, and other leaders co-construct and operate from common understandings about data use (Park and Datnow, 2009). Such processes constitute intentional efforts to support sense-making around data use - i.e., what "counts" as data and how data should be used- and help educators become more consistent and efficient in using data to inform instruction (Jimerson, 2014).

Hora, Bouwman-Gearhart, & Park's (2014) investigated institutional practices that motivate faculty to accept data-use to guide their decision-making. The results of their case study of three large, public universities revealed three central practices that facilitate data-use by faculty: providing structured opportunities for meaningful data collection and interpretation, providing adequate time for reflection about data, and a socio-cultural setting in which it was a norm to use data in daily practices. The authors state that introducing new practices in

relationship to a new data system, such as a learning analytics system, require an understanding of the “integrative theory of change” (p. 24) where external and local leaders work with experienced educators to establish data-driven practices within the educational culture.

Academic culture favors analysis over action; institutions have placed a high degree of importance on their reputations rather than on improving academic performance of their students (Norris, Baer, Leonard, Pugliese, and Lefrere, 2008). Thus in the majority of institutions, the development of actionable knowledge related to learning has been stalled at the data level with the collection of a large amount of data in a meaningless form (Elias, 2011). In order for the potential benefits of learning analytics to be realized it is essential that educators, students, and administrators have a foundation on which to enact change (Long and Siemens, 2011). Greller and Drachslrer (2012) propose a learning analytics implementation framework consisting of six dimensions in the higher education environment: stakeholders, objectives, data, instruments, external constraints, and internal limitations. Among internal limitations are a number of human factors that enable or may pose obstacles and barriers, most prominent are competences and acceptance.

At all levels of the education system, strong leadership and systems of accountability may facilitate successful data use. These include formal policies such as requiring and monitoring the use of specific DDDM practices, providing incentives for data use, or tracking teacher and administrator use of data systems (Gill, Borden, and Hallgren, 2014). From Bischel’s 2012 EDUCAUSE study:

The overwhelming consensus of all focus groups was that cultural change needs to start at the top. Participants advocated that executive leadership be on board with analytics.

Frequent comments regarding executive leadership were that the most effective leaders (a) start with a strategic question before consulting or collecting data, not the other way around; (b) do not let preconceived ideas influence questions, analysis, or decision making; and (c) rely more on the data and less on intuition, experience, or anecdotes. Many agreed that executive leaders did not have a good understanding of the time and expertise required. It was also suggested that both executive leaders and analysts need to work collaboratively to define strategic questions and develop a timeline for addressing them.

The literature is consistent in expressing the importance of active leadership “at the top” providing the groundwork for an effective DDDM culture. This is not limited to executive leadership conducting DDDM in their own capacity, it also includes providing the necessary infrastructure and professional development required to make DDDM an integral part of the institution’s culture.

## **CHAPTER THREE. METHODOLOGY**

### **Introduction**

This study aimed at 1) investigating how data quality, infrastructure, culture, professional development and other variables influence data-driven decision making (DDDM) participation levels in community college leadership, and 2) examining whether there are significant differences in DDDM between senior and non-senior community college leadership. This study adopted a quantitative approach utilizing the Community College Data Driven Decision Making (DDDM) survey which served as the instrument measuring community college leadership's DDDM levels and other key variables. The foundation of the survey instrument was developed using the 2012 and 2015 EDUCAUSE Analytics Survey, the Learning Analytics Readiness Instrument (LARI), and the President's Survey Tool, all previously tested survey instruments. Additionally, the literature reviewed in chapter 2, including the 2nd Edition of the American Association of Community Colleges Competencies for Community College Leaders, provided the framework for the constructs of infrastructure, professional development, and culture to be utilized in the analysis of community college leadership DDDM.

Descriptive statistics were used to examine the background characteristics of the leadership at the 15 participating Iowa community colleges. Independent sample t-tests were conducted to identify statistically significant differences between senior and non-senior leadership. A multiple regression analysis was conducted to investigate variables that can potentially predict community college leadership participation levels of DDDM. The purpose of this chapter is to illustrate the methodological approaches utilized in this study including:

research questions, statements of hypothesis, research design, conceptual model, variables, specific statistical techniques, ethical issues, and limitations of the study.

### **Research Questions**

In order to answer and guide this study for the intended research, five specific research questions were produced:

1. What are the demographic and background characteristics of community college leadership in the community college DDDM study?
2. Are there any statistically significant differences in personal involvement of DDDM between senior and non-senior administrators?
3. Are there any statistically significant differences in perceived institutional prioritization of DDDM and perceived institutional data quality between senior administrative and non-senior administrative?
4. Are there inter-correlations between variables in the study related to predicting leadership personal involvement in DDDM?
5. What are the variables that can help predict the level of personal involvement in institutional DDDM?

### **Hypothesis**

A hypothesis for every applicable research question was stated in a null hypothesis form. Research question one was limited to descriptive analysis thus only research questions two to five require hypothesis testing.

RQ2: Are there any statistically significant differences in personal involvement of DDDM between senior and non-senior administrators?

H1: There are no statistically significant differences in personal involvement of DDDM between senior and non-senior administrators.

RQ3: Are there any statistically significant differences in perceived institutional prioritization and perceived data quality of DDDM between senior administrative and non-senior administrative?

H2: There are no statistically significant differences in perceived institutional prioritization of DDDM and perceived institutional data quality between senior administrative and non-senior administrative.

RQ4: Are there inter-correlations between variables in the study related to predicting leadership personal involvement in DDDM?

H3: There are no inter-correlations between variables in the study related to predicting leadership personal involvement in DDDM.

RQ5: Are there variables that can help predict the level of personal involvement in institutional DDDM?

H4: There are no variables that can help predict the level of personal involvement in institutional DDDM.

## **Research Design**

In this study, the Community College Data-Driven Decision Making (DDDM) Survey was the instrument used to measure community college leadership DDDM participation levels of data quality, institutional DDDM infrastructure, institutional DDDM culture, institutional DDDM professional development, and other key variables. The Community College Data Driven Decision Making (DDDM) Survey is a research initiative started by Dr. Soko Starobin, Former Associate Professor in the Educational Leadership and Policy Studies program and Former Director of the Office of Community College Research and Policy at Iowa State University. The DDDM project has been continued by Dr. Lorenzo Baber, Associate Professor and Division Head for Higher Education at Iowa State University with the assistance of Dr. Yu (April) Chen, Post-doctoral Research Associate and Dr. Ran Li, Post-doctoral Research Associate. In addition, a research team of four doctoral students, Marvin DeJear, Brett Monaghan, Sly Upah, and I have examined community college DDDM in depth.

The development of the DDDM survey instrument was conducted during 2015 and 2016 in three phases:

- Phase 1: Conducted review of previously tested DDDM survey instruments including the President's Survey: Demographics and Leadership Preparation Factors Survey, 2012 & 2015 EDUCAUSE Analytics Survey, and the Learning Analytics Readiness Instrument (LARI) survey. The research team utilized previous survey instruments' best practices to develop survey questions relevant to community college leadership data-driven decision- making (DDDM).

- Phase 2: Administered pilot survey to the leadership at three Iowa community colleges (Fall 2015).
- Phase 3: Revised pilot survey to eliminate redundant questions and shorten length to increase response rates.
- Phase 4: Tested pilot survey for reliability and validity

### **Phase 1: Initial survey design**

In the summer of 2015, the Iowa State DDDM research team conducted review of previously tested DDDM survey instruments such as the President's Survey: Demographics and Leadership Preparation Factors, EDUCAUSE Analytics Survey, and the Learning Analytics Readiness Instrument (LARI) survey. Authorization to use the previous research questions were obtained from the original source of each of the previous studies. The team utilized previous survey instruments' best practices to develop survey questions relevant to community college leadership data driven decision making (DDDM). From this examination of previous analytic studies, the pilot survey instrument was created. The pilot survey (Appendix A) included 43 questions, examining specific variables associated with data quality, DDDM culture, DDDM infrastructure, and DDDM professional development in community colleges. Permission for this study was sought and granted by the Iowa State University Institutional Review Board on September 28th, 2015 (Appendix C).

### **Phase 2: Pilot Study**

In the fall semester of 2015, three community colleges in the state of Iowa were chosen as pilots sites for this study. Each researcher was responsible for contacting the college officials,



obtaining approval to administer the study, establishing participants, and administering the study as agreed by the volunteering institution. The three sites chosen to participate in the pilot study include: Des Moines Area Community College, Eastern Iowa Community Colleges, and Indian Hills Community College. In approximately one month, 198 leaders from the three participating community colleges were invited to participate in the pilot study. The online survey software Qualtrics was utilized for the pilot study and was delivered to community college administrators in an email from the corresponding research team member asking them to participate in the study. During the duration of the survey, two reminder emails were sent to community college administrators who had not yet completed the survey. A total of 107 community college leaders completed the survey, giving a response rate of 54%. The survey was complete and quantitative analysis was used to examine the results and report back to the participating institutions.

### **Phase 3: Revise and shorten survey instrument**

Results and feedback from the fall 2015 pilot study indicated some potential areas of concern regarding the redundancy within the survey instrument. Many of the participants commented that the survey questions were repetitive and that the length of the survey was too long in general. While the pilot study had a response rate of 54%, the research team contributed this to the personal connections we each had at our corresponding campuses and it is unlikely that the response rate would be that high at institutions where the research team has little or no personal connection. Additionally, a review of the survey results found that many of the participants started the survey but failed to finish the survey completely.

As a result of these post-survey findings, the questions were reexamined by the research team based on pilot study results. Additionally, the survey items were reduced based on the

results of exploratory factor analysis (EFA). When looking at specific constructs, such as culture, questions that loaded lower than 0.6 were removed. After deleting the questions, all constructs' Cronbach's alpha scores were tested and the survey was significantly shortened. The survey instrument which previously contained 43 questions was narrowed down to 31 questions in an effort to decrease redundancy of questions and the length of time participants needed to complete the survey, with the intent of ultimately increasing response rates.

#### **Phase 4: Test for validity and reliability**

At the completion of the fall 2015 pilot study, the original survey instrument was once again examined to formally test reliability. In a quantitative study, reliability refers to the consistency and stability of the scores obtained through measurements (Creswell, 2008). Evidence of reliability was provided by the EFA results in the community college DDDM fall 2015 pilot study. The EFA results provided high Cronbach alpha coefficients among key constructs of the survey measurements, thus providing proof of reliability. Additionally the questions in the DDDM survey were developed based on previously tested survey instruments. Creswell (2012) describes validity in quantitative studies as: it is the extent to which interpretation of scores measures up to its proposed use. It is concluded in three traditional forms of validity: a) content validity (if the items measure what they intended to measure), b) predictive validity (if results correlate with other results), and c) construct validity (if items measure hypothetical concepts). For this pilot study, the surveys were created from previously tested research that had been published in peer-reviewed journals, thus deemed valid thorough previous quantitative research.

## **Survey Instrument**

The final version of the DDDM survey (Appendix B) was produced after completing the previously reviewed phases of the research design, including review of previous tested leadership and DDDM survey instruments, conducting the fall 2015 pilot study, cleaning and reducing the fall 2015 survey instrument, and reviewing the survey data for reliability and validity. The survey instrument has three sections: Demographics, Data-Driven Decision Making (DDDM), and AACC Leadership Competencies.

The purpose of the demographics section of the survey is to gather information on the background of the participating community college leaders including: age, gender, race/ethnicity, education level, position longevity, and level of leadership (senior or non-senior). These standard survey questions are structured for categorical responses.

The intent of the DDDM section is to gather community college leaderships' perceived levels of personal involvement of DDDM, as well as their perception of institutional priority regarding DDDM. This section also collects data on the perceived governance, infrastructure, culture, professional development and processes of their current institution in relation to DDDM. A majority of these questions capture the data on a Likert scale.

The last section of the survey is based off of the AACC's Competencies for Community College Leaders (2013). The questions are structured around AACC's five competencies including organizational strategy, institutional finance/research/fundraising/resource management, communication, collaboration, and community college advocacy. All five of the AACC leadership competency questions in this section contain multiple items and data is collected on the Likert scale.

### **Population and Sample**

The DDDM survey was developed specifically for community college leadership in this study. Community college leadership was defined as in this study as community college employees who maintain positions at the administration level, professional staff level, or faculty with management responsibilities at the department level or above. In total, 468 community college leaders from the 15 Iowa community colleges were invited to participate in the DDDM survey. The Iowa Department of Education (2015) classifies the 15 community college areas as the following:

- Area I: Northeast Iowa CC-(NICC) Administrative Center, Box 400, Calmar, Iowa 52132 - Fall 2015 Enrollment 4,865
- Area II: North Iowa Area CC- (NIACC) Administrative Center, 500 College Drive, Mason City, Iowa 50401 - Fall 2015 Enrollment 2,947
- Area III: Iowa Lakes CC- (ILCC) Administrative Center, 19 South 7th Street, Estherville, Iowa 51334 - Fall 2015 Enrollment 2,366
- Area IV: Northwest Iowa CC- (NCC) Administrative Center, 603 West Park Street, Sheldon Iowa 51201-1046 - Fall 2015 Enrollment 1,624
- Area V: Iowa Central CC- (ICCC) Administrative Center, 330 Avenue M, Fort Dodge, Iowa 50501 - Fall 2015 Enrollment 5,634
- Area VI: Iowa Valley CC district (it is comprised of Marshalltown CC and Ellsworth CC) – (IVCCD) Administrative Center, 3702 South Center Street, Marshalltown, Iowa 50158 - Fall 2015 Enrollment 2,761

- Area VII: Hawkeye CC- (HCC) Administrative Center, 1501 East Orange Road, Box 8015, Waterloo, Iowa 50704 - Fall 2015 Enrollment 5,371
- Area IX: Eastern Iowa CC District- (EICC) Administrative Center, 306 West River Road, Davenport, Iowa 52801 - Fall 2015 Enrollment 8,383
- Area X: Kirkwood CC- (KCC) Administrative Center, 6301 Kirkwood Blvd., S.W., Box 2068, Cedar Rapids, Iowa 52406-2068 - Fall 2015 Enrollment 14,814
- Area XI: Des Moines Area CC- (DMACC) Administrative Center, 2006 South Ankeny Blvd. Ankeny, Iowa 50021 - Fall 2015 Enrollment 22,298
- Area XII: Western Iowa Tech CC- (WITCC) Administrative Center, 4647 Stone Avenue, Box 5199, Area XIII: Iowa Western CC – (IWCC) Administrative Center, 2700 College Road, Box 4-C, Council Bluffs, Iowa 51502-3004- Fall 2015 Enrollment 6,562
- Area XIV: Southwestern CC – (SWCC) Administrative Center, 1501 West Townline Street, Creston, Iowa 50801 - Fall 2015 Enrollment 1,656
- Area XV: Indian Hills CC- (IHCC) Administrative Center, 525 Grandview Avenue, Ottumwa, Iowa 52501 - Fall 2015 Enrollment 4,773
- Area XVI: Southeastern CC- (SCC) Administrative Center, 1015 South Gear Avenue, Box 180, West Burlington, Iowa 52655 – 0180 Fall 2015 Enrollment 2,868 Sioux City, Iowa 51102-5199 - Fall 2015 Enrollment 6,152

Based on Katsinas and Lacey's (1996) five categories of classifications of two- year colleges, Iowa community colleges varies considerably and gives a decent sample of two-year institutions in terms of size. The categories based on full-time enrollment (FTE) are: very small

(less than 500), small (500–1,999), medium (2000–4,999), large (5,000–9,999), and very large (more than 10,000). Using these classifications Iowa has four small two-year institutions, nine medium two-year institutions, one large two-year institution, and two very large two-year institutions. There were no very small two-year institutions in the state of Iowa.

The Iowa community college districts provided contact information for 468 leaders who were then invited to participate in the study. At the close of the survey, 229 Iowa community college leaders responded to at least part of the survey and the overall response rate in this study was 48%. This sample size was representative of Iowa community college leadership population based on a comparison to the 2016 Iowa Department of Education's *Condition of Iowa's Community Colleges Report*. Additional analysis comparing the sample size to the population is covered in Chapter 4.

Within the sample size of community college leaders 121 were identified as senior leadership. The criteria to be identified as senior leadership in this study was participants' answer on survey question #2 "Which of the following most closely corresponds to your primary work responsibilities?" Community college leaders who reported themselves as "Administration" were identified as senior leaders, with the exception of community college leaders who reported "Other" as a follow up question to answering "Administration". They were removed from the sample examined in this study due to the inability to confirm their roles as senior-leadership. Examples of senior leadership include Top Executive or Senior Level Officer, Academic Dean, Assistant/Associate Dean, and Institutional Administrator. All community college leaders who reported themselves as "Faculty" or "Professional Staff" were identified as non-senior leadership. Examples of professional staff include non-administrative leaders in academic affairs, student affairs, facilities, athletics, and information technology.

### **Data Collection**

Permission for this revised study was once again sought and granted by the Iowa State University Institutional Review Board on February 18, 2016. With the help of IACCT (Iowa Association of Community College Trustees) and each community college's President and Institutional Research department the new survey was distributed to all 15 Iowa community colleges. Individual contacts were made and lists of community college leaders were compiled for each community college. The distribution list was finalized for each college based off of the community leaders identified by the definition of a leader for this study. The community college administrators invited to participate in the DDDM study were employed by one of the participating community colleges during the spring semester of 2016 and had management responsibilities at the department level or above. Job titles vary from community college to community college so for the purpose of this study we describe a department chair/coordinator as any faculty with management responsibilities for a specific field or department. The institutional researchers at each of the 15 Iowa community colleges worked with the research team to identify community college employees who met the minimum management responsibilities for this study.

The survey link was emailed to each invited participant and data was collected and using the Qualtrics online survey software. In this invitation e-mail, potential participants were informed of the background of the study, that all responses to the survey will be kept confidential, and that all data analysis will be conducted only with an aggregated dataset. Participants were given instructions on how to complete the survey in Qualtrics and allowed to stop taking the survey at any time and resume taking the survey if needed. Upon submitting the survey the participant's responses (including partial responses) were recorded by the Qualtrics system. The survey was sent to 14 of the Iowa Community College Areas on June 24, 2016. The

last of the Iowa community colleges, Iowa Western was sent the survey on August 11th, 2016. Three follow-up emails were sent to those who did not respond to the survey after sending out the initial email invitation, two periodically during the survey and one a day before the closing of the survey. The survey closed for all 15 of the Iowa community colleges on September 20th, 2016.

### **Conceptual Model**

The conceptual model for this study is displayed in (Figure 3.1) and was developed from previous literature on DDDM leading to improved student achievement and the supports and incentives needed to make effective data use possible. The first framework incorporated into the conceptual model is Adrianna Kezar's work on organizational change in higher education. More specifically, her description of higher education traits that leaders must recognize and understand in order to effectively lead transformative change. These unique characteristics are important as we discuss effective DDDM at higher education institutions. Much of the recent literature is focused on DDDM in other sectors and of the literature that does exist regarding DDDM in education, a majority of it has a K-12 focus. Kezar recognizes 15 distinct traits of higher education that leadership should consider when pursuing organizational change, such as building a culture of DDDM.

The second resource utilized was the DDDM theory of action and organizational supports which involve three sequential steps that together could produce improved student outcomes (Gill, Borden, & Hallgren, 2014). These three steps include assemble high-quality raw data, conduct analysis that ensure resulting data are relevant and diagnostic, and use relevant and diagnostic data to inform instructional and operational decisions. These three steps are held up

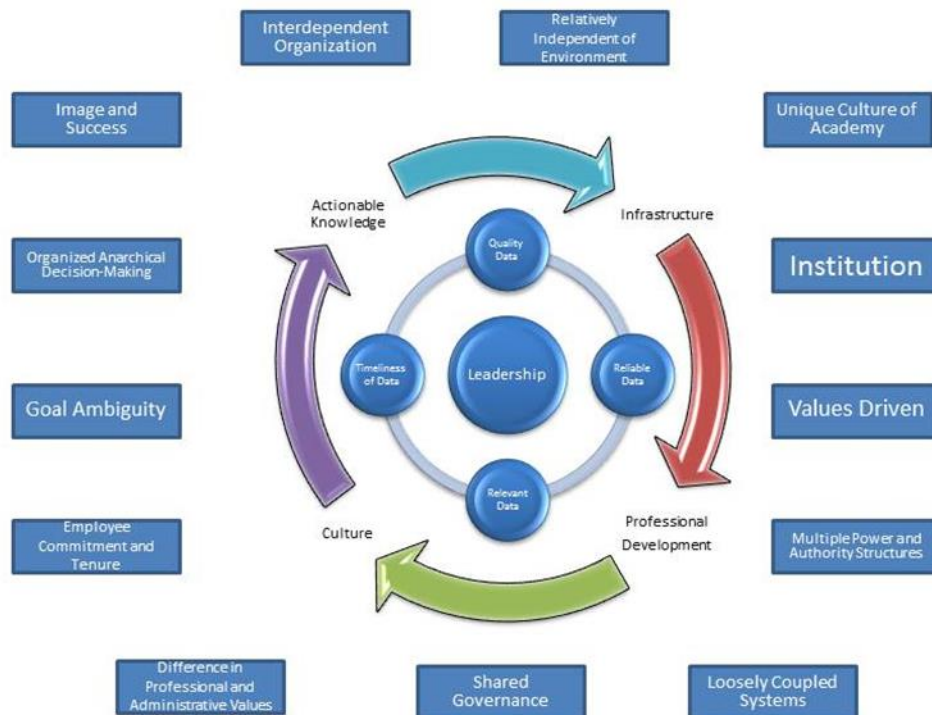


by three organizational supports: data infrastructure, analytic capacity, and a culture of data-drive decision making. At the broadest level, the general theory of action for DDDM involves three sequential steps that together could produce improved student outcomes (Gill, Borden, & Hallgren, 2014).

The third framework used as a basis of this study was Ikemoto and Marsh's (2007) framework for simple versus complex DDDM builds upon the previous framework to incorporate the complexities of educators making decisions in real-world settings. Their framework argues that DDDM can vary along two continua: the type of data used and the nature of data analysis and decision making. These two continua form four quadrants that a DDDM can fall into depending on the level of data and analysis & decision making complexity. The four quadrants are labeled "basic" (quadrant 1), "analysis-focused" (quadrant 2), "data-focused" (quadrant 3), and "inquiry-focused" (quadrant 4). For example, basic DDDM entails using simple data and simple analysis procedures whereas inquiry-focused DDDM involves using more complex data and complex analysis and decision-making complexity. Ikemoto and Marsh (2007) do not promote one quadrant as being better than the other, but instead explain how factors such as accessibility and timeliness of data, perceived validity of data, staff capacity and support, time, partnerships with external organizations, tools, organizational culture and leadership, and federal, state, and local policy context enable and constrain DDDM in higher education.

Lastly, Mandanich, Honey, and Light's (2006) framework for DDDM describes a multi-step process for conducting DDDMs. The first step consists of collecting and organizing raw data. The second step of the process includes using the raw data combined with an understanding of the situation through a process of analysis and summarization to yield

information. Next, the data users convert information into actionable knowledge by using their judgment to prioritize information and weigh the relative merit of possible solutions. Finally, a decision is made, implemented, and new data is collected to assess the effectiveness of the previous actions. This actionable knowledge portion and continuous testing of DDDM effectiveness was the portion of this framework that was incorporated into this study.



**Figure 3.1 Conceptual Framework of Community College DDDM**

## **Variables in the Study**

### **Dependent Variable**

*DDDM Personal Involvement.* The dependent variable of this study was community college leadership's level of DDDM participation at their institutions. In the survey, DDDM personal involvement was measured by Question 12: "How would you rate your personal involvement with the Data Driven Decision Making (DDDM) effort/discussion at your institution?" The scale of this question was "not at all=1, interested, but not involved=2, somewhat involved=3, highly involved=4, leading the conversation=5."

### **Independent Variables**

*Demographics.* Four variables were used to capture the demographics of this study. The variables measured participants' gender, age, race, and highest educational degree earned. The demographic measures were reflected in questions #7, #8, #9, and #10.

*Institutional DDDM Prioritization.* To measure institutional prioritization of DDDM, this study adopted question #14: "What priority does your institution place on use of DDDM?" The scale of questions was: major institutional prioritization=1 , major priority for some departments, units, or programs, but not for the entire institution=2 , an interest of the institution, but not a priority=3, intentionally not a priority or interest=4 , little awareness, and therefore not a priority or interest=5, don't know=6.

*Data quality.* To measure perceived data duality, this study utilized question # 18\_5: "At my institution, institutional reports routinely contain trustworthy data?" A 5-point Likert scale

was used to gauge responses: strongly disagree=1, disagree=2, neither agree or disagree =3, agree=4, and strongly agree=5.

*Infrastructure.* The infrastructure construct was adopted from the items in question #15 of the DDDM Survey. Infrastructure was measured by a 5-point Likert scale from strongly disagree (1) to strongly agree (5). An exploratory factor analysis confirmed the infrastructure constructs with the sample in this study.

*Professional Development.* Institutional professional development construct was adopted from 5 items within question #16 of the DDDM survey. Professional development was measured by a 5-point Likert scale from strongly disagree (1) to strongly agree (5). An exploratory factor analysis confirmed the professional development constructs with the sample in this study.

*Culture.* The institutional culture construct was adopted from 7 items within question #19 of the DDDM survey. Culture was measured by a 5-point Likert scale from strongly disagree (1) to strongly agree (5). A exploratory factor analysis confirmed the culture construct with the sample in this study.

### **Data Analysis**

A quantitative research approach was taken to evaluate the study and answer the research questions presented in earlier chapters. The data was examined using various statistical techniques, including descriptive analysis, comparative analysis, exploratory factor analysis, and a regression analysis. The statistical software IBM SPSS 23.0 was utilized for all quantitative analysis.

### **Descriptive Analysis and Comparative Analysis**

Descriptive analysis was used to address the first research question: What are the demographic and background characteristics of community college leadership in the community college DDDM study? From the DDDM data, frequencies were run to describe the four demographic characteristics of community college leaders that participated in the DDDM survey.

The second and third questions of the DDM study were examined by the use of comparative analysis. The second research question was: Are there any statistically significant differences in personal involvement of DDDM between senior and non-senior administrators? This question was addressed by conducting a t-test to investigate the difference in personal involvement of DDDM between senior and non-senior community college leaders. The third research question was: Are there any statistically significant differences in perceived institutional prioritization of DDDM and perceived institutional data quality between senior administrative and non-senior administrative? This question was also addressed by conducting a t-test to investigate the difference in perceived institutional prioritization of DDDM and perceived institutional data quality between senior and non-senior community college leaders.

### **Exploratory Factor Analysis**

The fourth question in this study asked: Are there inter-correlations between variables in the study related to predicting leadership personal involvement in DDDM? An exploratory factor analysis (EFA) was adopted to explore the inter-correlations among professional development items and to structure the constructs of institutional professional development. Using the same process, an EFA analysis was also conducted to explore the inter-correlations

among culture and infrastructure items. From the EFA, the constructs of institutional infrastructure and institutional culture were created for the DDDM study.

### **Regression Analysis**

Lastly, the fifth questions asked: What are the variables that can help predict the level of personal involvement in institutional DDDM? To answer this question a hierarchical regression analysis was conducted utilizing demographic information and the infrastructure, professional development, and culture constructs created from the EFA analysis. The purpose of using the regression analysis is to predict the impact of the variables on the dependent variable, DDDM participation levels. A hierarchical regression refers to an OLS regression in which predictors are entered in some order, presumably based on theory, and then increments in explained variance and changes in regression coefficients are evaluated (Cohen, Cohen, West, and Aiken, 2003). This statistical procedure allowed a fixed order of entry for variables in order to control for the effects of covariates and allowed the testing of the effects of certain predictors independent of the influence of other variables. The order of the variables entered coincides closely with the conceptual framework previously covered in this chapter.

### **Limitations**

As we examine the data and information it is important to notate the potential limitations of the DDDM study. The first limitation is that this study was limited to the 15 community colleges in the state of Iowa. While the intent of this study is to help community college leadership navigate the various aspects that impact DDDM on their campuses, it is important to note the demographics of community colleges outside the state of Iowa may be not align with this study.

The second limitation of the DDDM study is that it relied primarily on self-reporting. Additionally many of the questions are structured to get the participant's perception of the institution or fellow college employees. For example, question #14 asks the participant's perception of the institutional priority. It would be ideal to gauge actual use of DDDM at each participant's institution, both to capture actual DDDM use of the participants and their associated institution.

The third limitation of this study was the sample size. While the study met the required threshold for reliability and validity, a large sample size would give more insight into community college leadership DDDM and the variables that impact it. Additional participation by community college leaders would add depth to statistical analysis.

The last limitation of this study is that it is limited to participants who were deemed community college leadership by this survey's definition. This definition of leadership excludes many faculty and staff who could potentially have insight on DDDM at their institutions. Additionally, although the community colleges were provided the definition of community college leaders for the purposes of this study, ultimately each individual community college was responsible for providing the researchers with the leadership information for their institution. The various sizes (enrollment) and types (single or multi-campus) of community colleges in Iowa create various organizational structures that may impact each institution's definition of a leadership position.

### **Ethical Issues**

As a research that involves human participants, the proposal protocol application was approved by the Iowa State University Institutional Review Board (IRB) on September 28, 2016.

Each of the participating institutions was provided with a copy of the Iowa State University IRB application and the approval letter prior to the onset of the survey. Additionally, each of the 15 Iowa community colleges approved the survey to be distributed to their associated community college leaders.

One ethical consideration included the confidentiality of the participants. This study required a list of potential participants' names and e-mails to send out the online survey link. In order to ensure the confidentiality, a unique identifier was created and assigned to each participant. The personal identifiers were all removed from the data before any data analysis took place to protect the identity of the participating community college leaders.

### **Summary**

The purpose of this study was to investigate how select variables impact DDDM participation levels of community college leaders in the state of Iowa and to examine if this impacts senior and non-senior community college leaders differently. This chapter provides the methodology used to examine this topic including: research questions, hypothesis, research design, variables in the study, data analysis utilized, limitations, and ethical issues. The conceptual framework was developed based on an extensive review of literature and previous theoretical frameworks from experts in the field of DDDM, both in the field of education and in the public and private sectors. It is the intent that this research will add to the existing literature regarding community college leaderships' use of DDDM to make informed institutional decisions. In the next chapter, a complete report of the findings will be presented utilizing the analysis established in this chapter. In chapter 5, the significance of the results will be reviewed, as well as the implications for future research, policy, and practice.



## **CHAPTER FOUR. RESULTS**

### **Introduction**

This chapter presented detailed results of this study using tables, figures, and narratives. The first analysis includes descriptive results focused on demographic characteristics of the community college leaders in the study, including the comparison of senior level and non-senior level leadership. Second, the results of comparative analysis (t-tests) were reported in response to research questions two and three. This analysis focused on the comparison between senior level and non-senior level leadership and their current levels of DDDM involvement at their institutions and also their perceived levels of institutional prioritization of DDDM. The third analysis conducted is an exploratory factor analysis (EFA), which provided the findings regarding the constructs of culture and professional development that influence DDDM participation levels in community college leaders. Finally, my fifth research question asks to what extent do factors such as demographics, position longevity, highest degree earned, leadership level, institutional professional development, and institutional culture predict the level of DDDM participation levels amongst community college leadership. To answer this question a hierarchical multiple regression model is conducted to determine if independent variables: age, gender, race/ethnicity, leadership level, highest degree earned, culture (construct), professional development (construct) and position level are predictive of the dependent variable, DDDM participation levels of community college leaders.

### **Descriptive Analysis**

In order to describe the characteristics of the sample, a descriptive analysis was conducted on all leaders, the senior level leaders group, and non-senior level leaders group.

Senior level leadership roles were defined as leaders who described themselves as Top Executive or Senior Institutional Officer, Academic Dean, Head of Division or Department, Academic Associate or Assistant Dean or Institutional Administrator. Non-senior level leadership roles were defined as Faculty or Professional Staff. Survey respondents who responded as “Other Administration” were not classified into either group and removed. Table 4.1 presents the frequency and percentages of the variables involved in this analysis.

*Table 4.1 Descriptive analysis for all, senior level, and non-senior level leadership in DDDM study --- Frequency*

Variables	All Leadership (n=220)		Non-Senior (n=76)		Senior (n=121)	
	n	%	n	%	n	%
<b>Gender</b>						
Male	83	37.7	21	27.6	55	46.2
Female	131	59.5	55	72.4	64	52.9
Missing	6	2.7	0	0.0	2	1.7
<b>Age</b>						
35 & below	21	9.5	9	11.8	6	5.0
36-45	59	26.8	20	26.3	34	28.1
46-55	69	31.4	30	39.5	36	29.8
56-65	66	30.0	17	22.4	40	33.1
66 & up	5	2.3	0	0.0	5	4.1
<b>Race/ethnicity</b>						
Non-resident alien	1	0.5	0	0.0	1	0.8
Asian	1	0.5	1	1.3	0	0.0
African American	8	3.6	2	2.6	4	3.3
Pacific Islander	1	0.5	0	0.0	1	0.8

*Table 4.1 continued*

White	200	90.9	71	93.4	114	94.2
2 or more	3	1.4	1	1.3	0	0.0
Missing	6	2.7	1	1.3	1	0.8
Highest Degree Earned						
Associate's	11	5.0	8	10.5	2	1.7
Bachelor's	29	13.2	17	22.4	8	6.6
Master's	124	56.4	40	52.6	70	57.9
Doctorate level	48	21.9	9	11.8	39	32.2
Missing & Other	8	3.7	2	2.6	2	1.7

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As shown in Table 4.1, a majority of the participating leaders in this study were women (59%). This aligns closely with the Iowa Department of Education's 2016 *Condition of Iowa's Community Colleges* report that showed 58.2 % of all community college employees were female. When looking closer at the level of leadership for women in this study, 72% of the participants at the non-senior leadership level were women and a smaller proportion (52%) of the senior leadership were women. Comparatively, males accounted for 37% of the overall participants, 27% of non-senior leadership and 46% of senior leadership. Proportionally males were more likely to hold senior level leadership roles than women in this study.

In terms of age the largest group in cumulative sample was the 46-55 age group (n=69) followed closely by the 56-65 age group (n=66) and 36-45 age group (n=59). The largest group for non-senior leaders was also the 46-55 age group with 39%. The largest age group for senior level leadership was the 56-65 age group with 33%. Not surprisingly, the senior level leadership was older overall than the non-senior level leadership.

Race/ethnicity in this study is primarily White or Caucasian with 90% of the cumulative sample. The sample was reflective of the Iowa Department of Education's 2016 *Condition of Iowa's Community Colleges* report that showed 89.8 percent of Iowa community college employees identifying at white or Caucasian. The percentages of White or Caucasian in both non-senior leadership (93%) and senior leadership (94%) were also very high. The second largest group in the cumulative study was Black or African American with 3.6%. Black or African American was also the second largest group for non-senior leadership (2.6%) and senior leadership (3.3%). Overall, non-White or non-Caucasians made up for less than 1 in 10 respondents in this study on Iowa Community College leadership.

When examining the highest degree earned by the participants and the various types of degrees available, the levels of degrees were regrouped by level. The degree of "Education Specialist" was regrouped into the Masters degree level. Additionally, the "Ph.D", "Ed.D", and "J.D." respondents were regrouped into the "Doctorate level" group. The Associate degree level and Bachelor degree level remained unchanged from the survey and the "other degree" was removed. The most common level of degree earned in the cumulative group was Master's degree with 56%. Similarly, Master's degree was also the highest degree earned in non-senior leadership (52%) and senior leadership (57%). In non-senior leadership the second most commonly degree level earned was Bachelor's with 22%. However, the second most commonly earned degree in senior leadership was the Doctorate level with 32%.

*Table 4.2 Descriptive analysis for all senior and non-senior level leadership participants -- Means and SDs*

Variables	All Leadership (n=220)		Non-Senior (n=76)		Senior (n=121)	
	Mean	SD	Mean	SD	Mean	SD
Age	49.90	9.39	48.28	8.61	50.60	9.73
Highest Degree Earned	3.32	1.28	2.89	1.28	3.68	1.26
Years in current position	7.82	6.79	9.84	7.74	6.46	5.98

As described in the previously referenced literature, it is important to examine leadership at all levels of an organization. As shown in Table 4.2, it can be concluded that non-senior participants in this study have a younger average age (48.28 years old) compared to senior level leaders (50.60). The senior level leadership sample was reflective of the Iowa Department of Education's 2016 *Condition of Iowa's Community Colleges* report that reported a mean age of 53.8 years for community college administrators in Iowa. Senior level participants average a higher level of degree attainment than non-senior participants. Interestingly, non-senior leaders (9.84 years) on average have 3 more years of longevity in their current roles than senior leaders (6.46).

### **Comparative Analysis**

The comparative analysis for this study included three t-test. This technique was used to answer the second and third research questions. Specifically, a comparative analysis was conducted between non-senior leadership and senior leadership on personal involvement of DDDM and perceived institutional prioritization of DDDM.

The second question asked, “Are there any statistically significant differences in personal involvement of DDDM between senior and non-senior administrators?” As indicated in chapter 3, the criteria to determine the two comparison groups for this study were based on the participant’s response to question #2. After pulling out the participants who answered “other administration”, it was determined there were 117 senior level and 69 non-senior level leaders. The variable personal involvement was computed using question #12 about the participant’s personal involvement in strategic institutional data driven decision-making and level of preparedness in association with the American Association of Community Colleges Core Competencies for Community College Leaders. The question asked survey participants to rate their personal involvement with DDDM effort/discussion at your institution. The question offered five options for level of involvement: 1=Not at all, 2=Interested, but not involved, 3=Somewhat interested, 4=Highly Involved, 5=Leading the conversation, and 6=Don’t know. The variable personal involvement was recoded to remove all participants who answered “don’t know”. In this study, personal involvement (dependent variable) was continuous, thus a t-test was conducted. The *t* and *p* statistics were used to determine the statistical significance.

*Table 4.3 t-test on DDDM personal involvement for leadership groups*

		Leven’s Test for Equality of Variances		<i>t</i> -test for Equality of Means				
		F	Sig.	t	df	Sig. (2- tailed)	Mean Diff	Std. Error Diff
Perso nal Invol vement	Equal variances assumed	.010	.922	-5.313	184	.001	-.846	.159
	Equal variances not assumed			-5.366	147.197	.001	-.846	.158

As shown in Table 4.3, non-senior and senior community college leaders were found statistically significantly different in terms of personal involvement in DDDM at their institutions ( $t = -5.313$ ,  $p < .001$ ). Senior community college leaders had a mean of 3.37 compared to non-senior leadership with a mean of 2.52.

The third research question has two parts, it examines if there any statistically significant differences in perceived institutional prioritization and perceived quality of data between senior administrative and non-senior administrative? The variable institutional prioritization was computed using question #14 about the participant's perceived level of institutional priority for DDDM. The questions asked survey participants: what priority does your institution place on the use of DDDM? The questions offered the following levels of priority: 1=Major Institutional Priority, 2=Major priority for some departments, units, or programs, but not for the entire institution, 3=An interest of the institution, but not a priority, 4=Intentionally not a priority or interest, 5=Little awareness, and therefore not a priority of interest 6=Don't know. The variable institutional priority was recoded to remove all participants who answered "don't know". Institutional priority (dependent variable) was continuous, thus a  $t$ -test was conducted. The  $t$  and  $p$  statistics were used to determine the statistical significance.

*Table 4.4 t-test on perceived institutional prioritization of DDDM by leadership groups*

		Leven's Test for Equality of Variances		<i>t</i> -test for Equality of Means				
		F	Sig.	t	df	Sig. (2- tailed)	Mean Diff	Std. Error Diff
Institutional Priority	Equal variances assumed	27.21	.000	3.246	184	.001	.799	.246
	Equal variances not assumed			2.955	106.117	.004	.799	.270

As shown in table 4.4, senior administrative had a statistically significant higher level of perceived institutional priority given to DDDM than non-senior administrative ( $t=2.955$ ,  $p<.01$ ). The mean for senior administrative leaders was 2.27 (higher perceived institutional priority) compared to 3.07 for non-senior leadership.

The variable data quality was computed using question #18\_5 about the participant's perceived level of institutional data quality. The questions asked survey participants to respond to the following statement: At my institution, institutional reports routinely contain trustworthy data. The questions offered the following levels of agreement: 1=Strongly disagree, 2=Disagree, 3=Neither agree nor disagree, 4=Agree, and 5=Strongly agree. Institutional priority (dependent variable) was continuous, thus a t-test was conducted. The  $t$  and  $p$  statistics were used to determine the statistical significance.

*Table 4.5 t-test on perceived quality of data by leadership groups*

		Leven's Test for Equality of Variances		$t$ -test for Equality of Means				
		F	Sig.	t	df	Sig. (2- tailed)	Mean Diff	Std. Error Diff
Institutional Priority	Equal variances assumed	5.003	.027	.469	176	.640	.080	.170
	Equal variances not assumed			.504	165.722	.615	.080	.158

As shown in table 4.5, there was no statistical significant difference in the perceived quality of institutional data between senior and non-senior leadership. The mean for senior administrative



leaders was 4.45 (slightly higher perceived data quality) compared to 4.38 for non-senior leadership.

### Exploratory Factor Analysis

The fourth question presented in this study is: Are there inter-correlations between variables in the study related to predicting leadership personal involvement in DDDM? To answer this question an exploratory factor analysis (EFA) was performed utilizing SPSS software to explore construct configuration among the variables. The purpose on EFA in this study was to identify underlying constructs of infrastructure, culture, and professional development that could be used to determine participation rates of community college leaders. The selection of the variables was based on a review of the literature and the previous studies that helped compose the survey instrument. The EFA analysis was conducted on all survey participants after the data was cleaned up. The findings of the EFA analysis are in Table 4.5.

*Table 4.6 EFA results for all participants(infrastructure, professional development, and culture)*

Variables	Factor Loading
Infrastructure ( $\alpha=.852$ )	
My institution has measurable objectives that will indicate if success has been achieved.	.837
People from multiple offices across my institution are involved in the effort.	.808
My institution has well defined goals for the implementation of use of data.	.768
My institution has developed interventions to implement with appropriately identified students	.754
My institution views the use of data as a long term investment, rather than short term expense.	.751
My institution has the ability to store and manage increasingly large volumes of data.	.640
Professional Development ( $\alpha=.831$ )	
My institutional researcher knows how to present data/reports in ways that are visually intuitive and easily understood.	.796

*Table 4.6 continued*

My institution has professionals who have specialized training in data- use.	.795
My institution has professionals who train diverse constituents on the use of new and existing data systems	.781
My institution has a sufficient number of professionals who are able to provide support in the use of data	.762
My institution has professionals who know how to use and apply data to their areas	.729
Culture ( $\alpha=.850$ )	
My institution has a culture that accepts the use of data to make decisions.	.791
My institution's administrators generally accept the use of data for decision making.	.787
My institution has a clear vision of where it can make changes to help students be more successful academically.	.787
My institution has shared the definition of "student success" with faculty, staff, and students alike.	.697
My institution is ready to put resources behind the research necessary to implement DDDM	.688
My institution's faculty largely accept the use of DDDM for improving teaching and learning	.674
My institution has had conversations regarding the sustainability of DDDM effort	.657

The exploratory factor analysis was conducted by principal component analysis with varimax rotation utilizing SPSS. The KMO measure of sampling adequacy and Bartlett's test of sphericity were conducted on the three proposed constructs to ensure adequacy for conducting factor analysis. The constructs infrastructure (.863), professional development (.806), and culture (.855) all showed sampling adequacy and were statistically significant ( $p<.001$ ). Additionally, all three proposed constructs also had eigenvalues larger than 1. The factor loadings for the three constructs were generally good (higher than .600). According to Kline (2011), a factor loading around .90 is excellent, .80 is very good, .70 is adequate, .60 is questionable, and around .50 is considered unacceptable.

The first construct “infrastructure” included all items from survey question #15. This set of items described the survey participant’s agreement with their institution having the necessary infrastructure in place for DDDM. The participants were asked to rate their opinions on institutional infrastructure and responses were measured with a 5-point Likert scale from strongly disagree to strongly agree. The questions included: 1.) My institution views the use of data as a long-term investment, rather than a short-term expense 2.) My institution has measurable objectives that will indicate if success has been achieved 3.) My institution has developed interventions to implement with appropriately identified students 4.) My institution has well defined goals for the implementation of use of data 5.) People from multiple offices across my institution are involved in the effort 6.) My institution has the ability to store and manage increasingly large volumes of data. The factor loading of the items ranged from .640 to .837. The infrastructure construct had a high alpha level of .852 indicating a good internal reliability.

The second construct “professional development” included all items from survey question #16. This set of items described the survey participant’s agreement with the institution having the proper professionals and professional development in place for DDDM. The questions included: 1.) My institution has professionals who know how to use and apply data to their areas 2.) My institution has professionals who have specialized training in data-use 3.) My institution has a sufficient number of professionals who are able to provide support in the use of data 4.) My institutional researcher knows how to present data/reports in ways that are visually intuitive and easily understood 5.) My institution has professionals who train diverse constituents on the use of new and existing data systems. These questions was measured with a 5-point Likert scale from strongly disagree to strongly agree. All five items had a factor loading of over

.70. The alpha level of the professional development construct was .831 indicating it has the required internal reliability.

The second construct “culture” included all items from survey question #19. This set of items describes the survey participant’s agreement with statements about the institution’s culture and process for DDDM. The questions included participant’s agreement with the following questions: 1.) My institution is ready to put resources behind the research necessary to implement DDDM. 2.) My institution’s administrators generally accept the use of data for decision making. 3.) My institution has had conversations regarding the sustainability of DDDM effort 4.) My institution has a culture that accepts the use of data to make decisions 5.) My institution’s faculty largely accept the use of DDDM for improving teaching and learning 6.) My institution has shared the definition of “student success” with faculty, staff, and students alike. These questions were measured with a 5-point Likert scale from strongly disagree to strongly agree. The factor loading of the items in this construct ranged from .657 to .791. The alpha level of the culture construct was .850 indicating a good internal reliability.

### **Regression Analysis**

The fifth question in my research question asked: *what are the variables that can help predict the level of personal involvement in institutional DDDM?* Multiple regressions, using a sequential/hierarchical model, were employed to observe changes in significance of variable relationships between models. Gill, Borden, and Hallgren’s (2014) Data-Driven Decision Making conceptual model was used as a guide to organize the data, including the order in which the variables were enter into each block of the overall regression analysis. The regression analysis was performed using the SPSS 23 software.

The factors examined in the first block included Q7 (actual age), Q8 (gender), Q9 (white or non-white), Q6 (position longevity), Q10 (leader's highest degree earned). Q9 was recoded for this analysis as 1-7,9=0 (non-white) and 8=1 (white). Q10 was recoded as 1=1 (Associate's and below); 2=2 (Bachelor's); 3-4=3 (Master's) and 5-7=4 (Doctorate). The participants answering "other" for higher degree earned were removed. The second block included the original five variables plus Q2/Q3 (leadership level). All participants answering "Administration" for Q2 were coded as "0", with the exception of the participants who answered Assistant/Associate Dean for follow up Q3, these participants were coded as "1". Additionally, participants answering "other" for Q3 were removed. All participants answering "faculty" or "professional staff" for Q2 were coded as "1". The third block included the six previous variables plus the professional development construct previously created using exploratory factor analysis. The fourth and final block culture construct previously created using exploratory factor analysis.

The dependent variable Q12 (personal involvement in institutional DDDM) was recoded to remove all participants who answered "don't know". After removing these participants, 197 participants remained in this analysis. Based on the previous exploratory factor analysis (EFA) performed in this chapter, the constructs of institutional professional development and institutional culture were created and used as independent variables in the regression analysis. Multicollinearity of variables was tested within the entire model and met the necessary parameters. The model was tested and found statistically significant,  $F(8, 160) = 7.287, p < .001$ . The  $R^2$  increased with the addition of each new variable and accounted for approximately 23% of the variance of leadership participation levels of DDDM.

*Table 4.7 Regression Analysis for Variables Predicting DDDM Participation Levels of Community College Leadership (n=197)*

	B	$\beta$	<i>t</i>	<i>p</i>	Adjusted R <sup>2</sup>
<b>Block 1</b>					
Constant	1.414		2.237	.027	.121
Age	.013	.109	1.369	.173	
Gender	-.098	-.042	-.582	.561	
White/Non-white	.534	.106	1.459	.146	
Position Longevity	-.029	-.177	-2.296	.023	
Highest Degree Earned	.256	.299	4.004	.000	
<b>Block 2</b>					
Constant	1.225		2.010	.046	.188
Age	.008	.067	.869	.386	
Gender	.002	.001	.015	.988	
White/Non-white	.490	.097	1.392	.166	
Position Longevity	-.017	-.101	-1.319	.189	
Highest Degree Earned	.200	.233	3.158	.002	
Leadership Level	.676	.289	3.818	.000	
<b>Block 3</b>					
Constant	.839		1.145	.254	.188
Age	.009	.071	.917	.361	
Gender	.007	.003	.040	.968	
White/Non-white	.508	.101	1.442	.151	
Position Longevity	-.017	-.104	-1.349	.179	
Highest Degree Earned	.203	.237	3.207	.002	
Leadership Level	.676	.289	3.814	.000	
DDDM Professional Dev.	.101	.067	.951	.343	
<b>Block 4</b>					
Constant	.343		.469	.640	.230
Age	.008	.062	.828	.409	
Gender	-.080	-.035	-.495	.621	
White/Non-white	.359	.071	1.036	.302	
Position Longevity	-.016	-.099	-1.318	.189	
Highest Degree Earned	.182	.213	2.938	.004	
Leadership Level	.598	.256	3.427	.001	
DDDM Professional Dev.	-.136	-.089	-1.060	.291	
DDDM Culture	.502	.268	3.129	.002	

The predictor variables entered into the regression equation in four models on the dependent variable are indicated in Table 4.7. In Model 1, community college leadership demographic variables were entered into the regression. For Model 2, the level of leadership (senior or non-senior leadership) was added into the equation. For the third model, the construct of institutional DDDM professional development was entered. Finally, in the fourth model the construct of institutional DDDM culture was entered into the regression model. Included in Table 4.7 is the Cox-Snell coefficient of determination ( $R^2$ ) to explain the proportion of variances in DV that can be explained by the model.

In Model 1, the position longevity of participants,  $\beta = 0.177$ ,  $p < .05$ , had a negative association with personal participation levels of DDDM. However, the variable highest degree earned,  $\beta = 0.299$ ,  $p < .001$ , had a positive beta coefficient. After entering the input variable leadership level (senior or non-senior leadership) into Model 2, position longevity no longer had a significant relationship and highest degree earned,  $\beta = 0.233$ ,  $p < .01$ , continued to have a positive association along with the added variable. Leadership level,  $\beta = 0.289$ ,  $p < .001$ , also had a positive association with participation levels of DDDM.

In Model 3, the professional development construct previously created using exploratory factor analysis was entered into the regression. Highest degree earned,  $\beta = 0.237$ ,  $p < .01$ , and leadership level,  $\beta = 0.289$ ,  $p < .001$ , continued to have a positive association with leadership participation levels. The newly added professional development construct was not found to have a statistically significant association with leadership participation levels.

In the fourth and final model, the culture construct previously created using exploratory factor analysis was entered into the regression. Once again highest degree earned,  $\beta = 0.213$ ,  $p < .01$ , continued to have a positive association with leadership participation levels.

.01, and leadership level,  $\beta = 0.256$ ,  $p < .001$ , continued to have a positive association with leadership participation levels and the professional development construct did not have a statistically significant association with leadership participation levels. The newly enter culture construct,  $\beta = 0.268$ ,  $p < .01$ , had a positive association with leadership participation levels.

The construct of infrastructure was not used in the regression model due to it not being statistically significant. This is contrary to the literature examined in chapter 2 and may be due to a couple different methodological reasons. First, the limited sample size for this study may have hindered the constructs from being statistically significant. Second, the sample is strictly from Iowa community colleges and it may not be reflective of the infrastructure covered in the literature review.

In summary, using age, gender, race/ethnicity, position longevity, highest degree earned, leadership level, institutional professional development, and institutional culture as predictors, a multiple regression analysis to predict personal participation levels of DDDM for community college leaders. A test of the full model against the constant only model was statistically significant, indicating that, as a set, the predictors reliably distinguished between participation levels of community college leaders. Specifically, that highest degree earned, leadership level, and institutional culture (positively) made significant contributions to predicting DDDM participation levels of community college leaders.

### **Summary**

This study examined the DDDM participation levels of community college leadership, as measured by participant's response to DDDM participation levels at their current institution. The outcomes were studied for their relationship to demographics including age, gender,



race/ethnicity, position longevity, highest degree earned, leadership level, perceived institutional prioritization of DDDM, institutional professional development, and institutional culture. This chapter presented findings from this study using descriptive statistics, correlation analysis, exploratory factor analysis, and hierarchical (also known as entry or stepwise method) regression. Findings showed that senior level leadership have statistically significant higher levels of DDDM participation and perceived institutional prioritization of DDDM than non-senior level leadership. Additionally, variables such as highest degree earned, leadership level, and institutional culture can positively predict DDDM participation levels of community college leadership. Chapter 5 includes discussion and implications of the findings as well as recommendations and conclusions.

## **CHAPTER 5. DISSCUSSION, CONCLUSIONS, AND IMPLICATIONS**

### **Introduction**

In this study will present a current review of the literature, methodology used in this study, results of the study, and finally the corresponding discussion and implications for practice. Chapter Two provided an extensive literature review on the history of DDDM in the field of higher education, important qualities of data for effectiveness, and previous community college leadership studies on the infrastructure, professional development and culture of DDDM. Chapter Three reviewed the methodological approaches and resources used in this study including the research design, variables in the study, type of data analysis utilized, associated ethical considerations, and expected limitations. Chapter Four presented the main findings of the study included descriptive analysis of the community college leadership in the study, comparative analysis of senior and non-senior leadership in relation to DDDM participation, DDDM institutional importance, and perceptions of data quality, factor analysis of key institutional DDDM constructs, and multiple regression analysis to predict key indicators of leadership DDDM participation. Finally, in the Chapter Five, the findings will be discussed in relation to the literature review and implications/recommendations for practice and future research will be presented.

Given increasing pressure for institutions of higher education to use data to inform decision-making, it is important to understand what is known about the opportunities and challenges facing DDDM (Bouwman-Gearhart & Collins, 2015). Policymakers at the local, state, and national level are increasingly suggesting that data-based systems be instituted as part of an accountability system. Since 2005, over 200 community colleges have been involved in

the Achieving the Dream (ATD) initiative funded by the Lumina Foundation for Education. Community colleges make choices every day that may change the course of a student's life - and when decision-making is informed by data, there is heightened efficiency and focus that yields alignment in purpose ([www.achievingthedream.org](http://www.achievingthedream.org), 2017). ATD participation indicates a formal institutional commitment to data use, analysis and response towards improvement of programs, strategic planning, and fiscal management.

This study aimed at 1) investigating how infrastructure, culture, professional development and other variables influence data-driven decision making (DDDM) participation levels in community college leadership, and 2) examining whether there are significant differences in DDDM variables between senior and non-senior community college leadership. An examination of recent literature was conducted on 1) the history of higher education leadership and DDDM, 2) Kezar's factors for organizational change in higher education, 3) factors that impact data utilization, 4) DDDM infrastructure, 5) DDDM professional development, and 6) DDDM culture. Additionally, the conceptual framework was developed based on four existing models 1) Kezar's organization change in higher education, 2) Gill, Borden & Hallgren's (2014) theory of action and organizational supports, 3) Ikemoto and Marsh's (2007) framework for simple versus complex DDDM, and 4) Mandanich, Honey, and Light's process using DDDM to create actionable knowledge. After creating the conceptual framework of the study and examining the peer-reviewed literature, five research questions were developed to guide this study:

1. What are the demographic and background characteristics of community college leadership in the community college DDDM study?

2. Are there any statistically significant differences in personal involvement of DDDM between senior and non-senior administrators?
3. Are there any statistically significant differences in perceived institutional prioritization of DDDM and perceived institutional data quality between senior administrative and non-senior administrative?
4. Are there inter-correlations between variables in the study related to predicting leadership personal involvement in DDDM?
5. What are the variables that can help predict the level of personal involvement in institutional DDDM?

To answer these and other questions, the Iowa State University DDDM research team conducted the Community College DDDM survey to 15 Iowa community colleges. The methodology and analysis of this study were covered in chapters three and four. This final chapter will offer Iowa community college leader's discussion, conclusions, and implications related to strategic DDDM. Additionally, this chapter will offer recommendations for policy and practice for future studies, both in Iowa and across the nation.

### **Discussion of results**

The data analysis in chapter four provided us with the data necessary to examine the two goals of this study. This study aimed at 1) investigating how perceived DDDM institutional prioritization, data quality, infrastructure, culture, professional development and other variables influence data-driven decision making (DDDM) participation levels in community college leadership, and 2) examining whether there are significant differences in DDDM variables between senior and non-senior community college leadership.

As discussed in earlier chapters, the importance of institutional prioritization is prevalent in the literature review, including the AACC's *Competencies for Community College Leaders*. According to the AACC Competencies for Community College Leaders (2013), emerging leaders should understand the institutional dashboard and how to interpret data to improve the student academic experience within your unit of the institution. Additionally, the AACC (2013) states that community colleges need to have an ongoing focus on process improvement for internal and external customers. Yet the literature also suggests some issues with institutional prioritization of converting data into actionable knowledge. Academic culture favors analysis over action; institutions have placed a high degree of importance on their reputations rather than on improving academic performance of their students (Norris, Baer, Leonard, Pugliese, and Lefrere, 2008). Thus in the majority of institutions, the development of actionable knowledge related to learning has been stalled at the data level with the collection of a large amount of data in a meaningless form (Elias, 2011). The results indicate that there may be potential ground to gain regarding institutional prioritization. The mean for senior administrative leaders was 2.27 indicating it is a "major priority for some departments, units or programs, but not for the entire institution." The results for non-senior leadership (mean of 3.07), indicating institutional prioritization is an "interest of the institution, but not a priority." This also implies a statistically significant gap between senior and non-senior community college leadership regarding institutional prioritization of DDDM.

In regards to data quality impact on DDDM participation levels of community college leadership, Gill, Borden, and Hallgren (2014) suggest the quality of data, real or perceived, is critical to building a culture of DDDM. Many educators questioned the validity of some data, such as whether test scores accurately reflect students' knowledge, whether students take the

tests seriously, whether tests are aligned with curriculum, or whether satisfaction data derived from surveys with low response rates accurately measure opinions. The results of this study did not indicate any issue with perceived data quality. The mean for senior administrative leaders was 4.45 and 4.38 for non-senior leadership, indicating both group's means fall between agree and strongly agree that their institutional reports routinely contain trustworthy data. Additionally there was no statistically significant evidence that that data quality can predict DDDM participation levels of community college leadership.

The literature on operationalizing DDDM in higher education consistently expressed the importance of establishing a culture conducive of supporting DDDM. Park and Datnow (2009) stated, effective data use gains traction when teachers, administrators, and other leaders co-construct and operate from common understandings about data use. In order for the potential benefits of learning analytics to be realized it is essential that educators, students, and administrators have a foundation on which to enact change (Long and Siemens, 2011). The results of the regression model supported the cited literature and accounted for approximately 23% of the variance of leadership participation levels of DDDM. The construct of DDDM culture had a statistically significant positive association with community college leader's DDDM participations levels in the study. DDDM infrastructure and DDDM professional development were not statistically significant predictors of community college leader's DDDM participations levels.

Contrary to the literature on required institutional infrastructure for effective DDDM in higher education, the construct of DDDM infrastructure was not found statistically significant in the regression model. It is possible that the instrument used was not inclusive enough to represent the actual infrastructure needs of community colleges. A deeper examination of

literature may allow for more expansive questions within the survey instrument to accurately measure the current status of DDDM infrastructure in community colleges. Secondly, overall Iowa community colleges have a recent history of financial stability. A financial institutional review of literature could compare Iowa community colleges financial stability to that of their counterparts in other areas of the country. This could offer insight into Iowa's DDDM infrastructure support compared to the rest of the nation's community colleges.

The second purpose of this study was to examining whether there are significant differences in DDDM variables between senior and non-senior community college leadership. This was examined in t-tests comparing the groups (questions #2 & #3) and a regression analysis (question #5) to examine if leadership level is a predictor of institutional DDDM participation. Jenkins and Kerrigan's (2008) findings on Achieve the Dream data suggest that leadership commitment and a data-oriented approach to institutional management may not be sufficient to encourage faculty and administrators to become more data-oriented in practice. This implies that the notion of broad engagement in the process of analyzing student data is particularly important, especially for department and division chairs at the college. The results of the study suggest a gap exists between DDDM personal involvement levels of senior and non-senior leadership. The mean for non-senior administrators was 2.52, which indicates a mean somewhere between "interested, but not involved" and "somewhat interested". The mean for senior leadership indicated more participation but still indicated a mean closest associated to "somewhat interested". Additionally, leadership levels were found to be statistically significant and positively associated predictors of DDDM participation levels in the regression model.

### **Implications for policy and practice**

Institutions have created a culture of evidence when there is a routine practice of using data-informed decision-making to close achievement gaps and improve student outcomes in a continuous cycle of improvement. These colleges also align information technology (IT) with institutional research (IR) and provide their people access to key data and indicators that maximize their capacity to formulate and evaluate solutions that are scalable and impactful. Yet we know that data generation alone does not create cultural practice. Institutions must regularly engage stakeholders in examining data and identifying solutions for improvement (www.achievingthedream.org, 2017).

### **Implications for Practice**

The first recommendation for practice from the Community College DDDM study is for community college leaders, especially senior leadership with the ability to drive strategy, to understand that an effective culture is critical to DDDM. From this study and previous research we find that often community colleges have quality data, infrastructure, and professional development in place, yet they fail to transfer that data into actionable knowledge. Community college leaders should focus on strategic efforts that span across departments or programs and are a foundation for the entire institution. This requires constant engagement from leadership on the strategic use of DDDM to accomplish institutional goals. Institutions that lack a culture supportive of DDDM are often limited to using data for mandatory reporting and accountability purposes.

The second recommendation from this study is that community colleges need to establish practices that keep data relevant to the employee utilizing the data. Lack of effective data use due



to employees “drowning in data” was acknowledged numerous times in the literature. While data should be accessible to employees, leaders need to consider factors such as complexity, timeliness, and reliability of the raw data. While this study indicates no major perception issues with data quality, the participation levels of both senior and non-senior administrators in this study were below the established AACC *Competencies for Community College Leaders*. This may potentially indicate leaders may not believe the data is applicable to their daily use or that they do not have the skills required to analysis the data.

The third recommendation from the Community College DDDM study is for Iowa Community College leaders to explore the results of this study, specifically the statistically significant difference in means of senior and non-senior administration regarding participation levels of DDDM and institutional prioritization of DDDM. From this study of Iowa community college leadership, it seems clear non-senior administration does not hold the same views of institutional prioritization of DDDM as senior administration. Not surprisingly, they also have lower participation rates of DDDM. Executive community college leadership should explore ways to close these gaps and establish a culture of DDDM across all levels of community college leaders.

### **Implications for Policy**

On the state and national level, the Voluntary Framework of Accountability (VFA) is gaining traction as a guiding accountability system for community colleges. Recently, the Iowa Department of Education has partnered with the Iowa Association of Community College Presidents to implement VFA, a national effort to report on two-year college institutional effectiveness (Iowa Department of Education, 2017). The VFA measures gauge student progress

and outcomes including pre-collegiate preparation, academic progress and momentum points, completion and transfer measures, and workforce outcomes for career and technical education (AACC, 2017). The implications for the implementation of VFA will only reinforce the importance of effective DDDM culture and employee professional development as these metrics will establish institutional deficiencies, gauge future strategy, increase institutional transparency, and ultimately be used as a tool improve student outcomes. Additional metrics, from VFA or other sources, could be used in future state funding models to determine state funding for individual community colleges.

### **Recommendations for future research**

The community college DDDM study included higher education employees with management responsibility from all 15 Iowa community colleges. Further studies are needed to expand the reach of this study to increase the sample size. The additional sample size will allow for more detailed statistical analysis, including comparative analysis of factors impacting community college DDDM participation at the local, state, and national level. Additionally, the sample for this study is from one geographic portion of the country with limited diversity, thus a future study at the national level would be a better representation of community college leaders across the country.

Additional research associated with this study's findings on institutional DDDM culture and its associated impact on leadership DDDM participation would be relevant for future community college leadership. Specifically, additional research should be conducted on the changing culture of DDDM at institutions in relation to the participation and professional development of long-term employees. Future research could consider mix-methods or

qualitative methodology to expand on the existing findings in this study. Qualitative methods, such as interviews, could be conducted with long-term employees as a method to add detail to the quantitative analysis already completed.

Further studies are needed on the gap that exists between senior and non-senior community college leadership, especially regarding personal involvement of DDDM. From the analysis in chapter four, non-senior leadership is statistically significantly lower than senior leadership. Additionally, when compared to *AACC Competencies for Community College Leaders*, the mean for both senior and non-senior leadership fall short of the competencies associated with their level of leadership. Again, conducting qualitative methods, such as interviews, may expose additional information relevant to the DDDM development of future leaders.

### **Conclusion**

This study aimed at 1) investigating how infrastructure, culture, professional development and other variables influence data-driven decision making (DDDM) participation levels in community college leadership, and 2) examining whether there are significant differences in DDDM between senior and non-senior community college leadership. The findings of this study added to the research literature regarding DDDM and higher education. Specifically, the study examined community colleges, an area of higher education that has received less attention than K-12 and four-year institutions.

The results of the analysis found leadership level (senior or non-senior) and DDDM culture to be a statistically significant predictor of DDDM participation levels in community college leadership. However, DDDM infrastructure and DDDM professional development were

not found to be statistically significant predictors of DDDM participation levels in community college leadership. The analysis from the comparison of senior versus non-senior administration found that DDDM participation levels and perception of institutional prioritization of DDDM to be statistically significantly different. Senior administration exceeded non-senior administration in their DDDM participation and views of DDDM institutional prioritization.

In recent years higher educational institutions have expanded the use of DDDM beyond required reporting and basic analytics. School leaders are no longer resident experts about their schools. Instead they are faced with the daunting task of anticipating the future and making conscious adaptations to their practices, in order to keep up and to be responsive to an ever-changing environment (Earl and Fullan, 2003). It is the intent that this research will help future community college leaders establish effective DDDM practices to successfully navigate the continually changing world of higher education.

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## APPENDIX A: PILOT SURVEY

### DDDM DMACC pilot survey

#### Q1 Survey of Community College Data Driven Decision Making Fall 2015

Thank you for participating in the Survey of Community College Data Driven Decision Making (DDDM). This survey was developed by a research team in the Community College Leadership Program in the School of Education at Iowa State University. Using the 2012 and 2015 EDUCAUSE Analytics Survey, the Learning Analytics Readiness Instrument (LARI), and the President's Survey Tool, the constructs of the research that this newly developed instrument are vetted in is the 2nd Edition of the American Association of Community Colleges (AACC) Competencies for Community College Leaders. These constructs include organizational strategy, institutional finance, research, fundraising, and resource management, communication, collaboration, and community college advocacy. The researchers will use these constructs as a guide to examine data analytics and data driven decision making level at the community college. Specifically, we will take a look at how data usage is affected by leadership and how it affects infrastructure and student outcomes.

There are four sections in this survey. Please read the instructions in each of these sections and respond to questions carefully. We estimate it will take approximately 10- 15 minutes to complete the survey.

Please note that your personal identifiers (e.g., names, emails, etc.) will be kept confidential.

Your responses will not be provided to anyone in your college. Your answers will be analyzed as part of an aggregated data set.

The DDDM Research Team Marvin DeJear, Brett Monaghan, Matt Schmit Doctoral Students School of Education Iowa State University

## Q2 SECTION 1 - Data Driven Decision Making

How would you rate your personal involvement with Data Driven Decision Making (DDDM) effort/discussion at your institution?

- ☐ Not at all (1)
- ☐ Interested, but not involved (2)
- ☐ Somewhat involved (3)
- ☐ Highly involved (4)
- ☐ Leading the conversation (5)

Q3 Select the response that best describes the degree of involvement that each of the following positions have at your institution in regards to the use of DDDM.

Not currently involved in analytics (1)		Support/Contributor Role (2)	Leadership/Sponsor Role (3)	Don't know (4)	Don't have this position (5)
President/Chancellor (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Academic Officer or Provost (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Learning Officer or Equivalent (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Success Leader (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Information Officer or Equivalent (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Data Officer or Equivalent (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Director of Institutional Research (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Analytics Officer or Equivalent (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Financial Officer or Chief Business Officer (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4 Does your institution have a dedicated individual that leads DDDM efforts?

- ☐ Yes (1)
- ☐ No (2)

Q5 What priority does your institution place on the use of DDDM?

- ☐ Major institutional priority (1)
- ☐ Major priority for some departments, units, or programs but not for the entire institution (2)
- ☐ An interest of the institution but not a priority (3)
- ☐ Intentionally not a priority or interest (4)
- ☐ Little awareness, and therefore not a priority of interest (5)
- ☐ Don't know (6)

Q6 Indicate which response best describes the use of DDDM in each of the following areas at your institution?

[illegible]



Instructional management (which courses need to be offered, number of sections, staffing needs) (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Progress of institutional strategic plan (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Central IT (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilities (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Finance and budgeting (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human Resources (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
State/federal accreditation reporting (20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7 Could your institution benefit from the use of DDDM

- ☐ Yes (1)  
☐ No (2)

Q8 To what extent do you see the following as concerns about the use of data in higher education

Not a concern (1)		Minor concern (2)	Moderate concern (3)	Major concern (4)	Don't know (5)
The data used for DDDM aren't always accurate (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The data will be misused; wrong conclusions will be drawn (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student privacy rights will be breached (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Faculty privacy rights will be breached (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staff privacy rights will be breached (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government regulations will be imposed, requiring more reporting on performance metrics (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government regulations will be imposed, requiring questionable/flawed performance metrics (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Institutions won't be able to afford to construct effective DDDM strategies (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There will not be a sufficient return on investment; the money would be better spent elsewhere (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The higher education community doesn't know how to use data to make decisions (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This is another means of running higher education like a business, and that's the wrong model for higher education (18)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q9 Why, in your opinion, is your institution thinking about implementing DDDM? (check all that apply)

- ☐ Overall student achievement/success (1)
- ☐ Overall student retention (2)
- ☐ Overall student time to degree (3)
- ☐ Underrepresented minority student achievement/success (4)
- ☐ Underrepresented minority student retention (5)
- ☐ Underrepresented minority student time to degree (6)
- ☐ First year student achievement/success (7)
- ☐ First year student retention (8)
- ☐ Gender imbalance(s) (9)
- ☐ Course scheduling and delivery (10)
- ☐ Improving developmental education (11)
- ☐ Improving teaching (12)
- ☐ Collecting institutional data (13)
- ☐ Sharing institutional data (14)
- ☐ Identifying “students at risk” of academic failure (15)
- ☐ Increase internal collaborative efforts (16)
- ☐ Increase communication with external stakeholders (17)

## Q10 Governance/Infrastructure

Please rate your agreement with the following statements:

Strongly disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
My institution views the use of data as a long term investment, rather than a short term expense (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has measurable objectives that will indicate if success has been achieved (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has developed interventions to implement with appropriately identified students (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has well defined goals for the implementation of use of data (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People from multiple offices across my institution are involved in the effort (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has the ability to store and manage increasingly large volumes of data (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q11 The following questions ask about professionals with various skills and abilities. Please consider any individual employed by your institution (e.g. staff, faculty, etc) when answering these questions.

Strongly disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
My institution has professionals who know how to use and apply data to their areas (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has professionals who have specialized training in data- use (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has a sufficient number of professionals who are able to provide support in the use of data (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institutional researcher knows how to present data/reports in ways that are visually intuitive and easily understood (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has professionals who train diverse constituents on the use of new and existing data systems (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Q12 Data

For each source, please indicate to what extent your institution currently collects data:

Does not current ly collect (1)	There is an express ed desire, but no plan yet (2)	There is a plan to begin collecti ng this data (3)	Some departmen ts collect portions of this data (4)	My instituti on collects portions of this data (5)	Some departmen ts collect all/ nearly all of this data (6)	My instituti on collects all/ nearly all of this data (7)	Don' t kno w (8)
Student Records (e.g., demographics, academic history, degree infoplacement exams, achievement tests) (1)	?	?	?	?	?	?	?
Admissions (e.g., prospect demographics, interests, application data application evaluation, orientation data, high school/transfer information) (2)	?	?	?	?	?	?	?
Facilities (e.g., card swipes for access, food service usage, gym/recreational facility usage) (3)	?	?	?	?	?	?	?
Financial Aid (e.g., FAFSA data, scholarship award applied/accepted, dependency status, work study award) (4)	?	?	?	?	?	?	?
Housing (e.g., application data, roommate matching, preferences, placement, renewal) (5)	?	?	?	?	?	?	?
Human Resources (e.g., employment history, FTE, student employment and internships) (6)	?	?	?	?	?	?	?

Alumni/Development (e.g., membership, contribution history, employment data, transfer data, relocation information) (7)								
Library (e.g., circulation, electronic text access, help requests, workshop attendance, computer usage) (8)								
National Institutional Surveys (e.g., CCSSE) (9)								
College Internal Surveys (e.g., orientation, program specific, course-specific, exploratory, IT use/satisfaction) (10)								
Learning/Management System/Course Management System (e.g., user log data, assignment grades) (11)								
File Servers/Cloud Files Space (e.g., user log data) (12)								

Q13 At my institution:

Strongly disagree (1)		Disagree (2)	Neither Agree nor Disagree (4)	Agree (5)	Strongly Agree (6)
Institutional reports routinely inform institutional decisions (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is an established routine process for eliminating or phasing out unused institutional reports (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Persons attempting to replicate reports/data can do so regularly (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Institutional reports routinely inform departmental decisions (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Institutional reports routinely contain trustworthy data (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are routine scripts/processes for refreshing/updating institutional reports (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



## Q14 Culture and Process

Please rate your agreement with the following statements regarding conversations about data, decision making, and student success on your campus:

Strongly disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
My institution is ready to put resources behind the research necessary to	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution's administrators generally accept the use of data for decision making	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has had conversations regarding the sustainability of data science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has a clear vision of where it can make changes to help students be more successful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has a culture that accepts the use of data to make decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution's faculty largely accept the use of DDDM for improving teaching and learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has shared the definition of "student success" with faculty, staff, and students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q15 Provide your best estimate of how data are being used in various functional areas of your institution. Select all that apply:

	We do not collect usable data (1)	Data are collected but are never or rarely used (2)	We create and use analyses or reports to monitor operations or programs (3)	We create and use analyses or reports to make projections for programs or groups (4)	We create and use predictive analyses or reports that may trigger proactive responses (5)
Student Learning (real-time or on-demand assessment and feedback) (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Learning (learning outcomes, course completion) (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Degree Planning (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Progress (retention, graduation, etc) (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enrollment management, admissions, and recruiting (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost to complete degree (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q16 At my institution, I would describe the communication about data (either raw data or in report form) as:

- ☐ Highly decentralized: Data/reports shared in small groups within departments and selected individuals available with permission (1)
- ☐ Most decentralized: Data/reports shared within departments and selected individuals available if you know who to ask (2)
- ☐ Level: Nearly all data/reports shared across the institution and broadly available (3)
- ☐ Mostly centralized: Data/reports controlled by central administration or IT, but most made broadly available (4)
- ☐ Highly centralized: Data/reports controlled by central administration or IT available at their discretion (5)

Q17 SECTION 2 – Leadership Development

In what ways have you engaged in external programs that have contributed to the development of your DDDM competencies in your current position? (check all that apply)

- ☐ Conference attendance (1)
- ☐ Commercialized training (2)
- ☐ Academic training (3)
- ☐ Professional organizations (4)
- ☐ Webinars/online (5)

Q18 In what ways have you participated in internal programs that have contributed to the development of your DDDM competencies in your current position?

- ☐ Departmental (1)
- ☐ Campus-wide (2)
- ☐ District level (3)

Q19 Who has influenced your DDDM skills the most?

- ☐ A supervisor (1)
- ☐ Co-workers (2)
- ☐ External constituents/partners (3)
- ☐ Professional relationships (4)
- ☐ Academic advisor/mentor (5)
- ☐ Academic peers (6)

Q20 If your community college sponsors or participates in an internal leadership development program, who are the targeted participants in the program? (check all that apply)

- ☐ Top administration (presidents, vice-presidents, and deans) (1)
- ☐ Mid-level academic managers (department chairs) (2)
- ☐ Mid-level managers or directors (3)
- ☐ Faculty (4)

Q21 In your role as a community college leader, on average, how often do you meet each month or discuss DDDM with each of the following?

	0 (1)	1 (12)	2 (2)	3 (3)	4 (4)	5+ (5)
Cabinet level administrators (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Faculty (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other college staff (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
College board members (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other community college leaders (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other education officials (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business/industry officials (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local, state or national elected officials (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q22 Select the top three areas that utilize DDDM in your institution:

First Area (1)	<input type="radio"/> Academic issues (1)	<input type="radio"/> Accountability (2)	<input type="radio"/> Athletics (3)	<input type="radio"/> Budget/financial management (4)
Second Area (2)	<input type="radio"/> Academic issues (1)	<input type="radio"/> Accountability (2)	<input type="radio"/> Athletics (3)	<input type="radio"/> Budget/financial management (4)
Third Area (3)	<input type="radio"/> Academic issues (1)	<input type="radio"/> Accountability (2)	<input type="radio"/> Athletics (3)	<input type="radio"/> Budget/financial management (4)

First Area (1)	○ Risk management (5)	○ Diversity (6)	○ Enrollment management (7)	○ Entrepreneurship (e.g., revenue generating activities) (8)
Second Area (2)	○ Risk management (5)	○ Diversity (6)	○ Enrollment management (7)	○ Entrepreneurship (e.g., revenue generating activities) (8)
Third Area (3)	○ Risk management (5)	○ Diversity (6)	○ Enrollment management (7)	○ Entrepreneurship (e.g., revenue generating activities) (8)

First Area (1)	○ Fundraising (9)	○ Governing board relations (10)	○ Personal issues (e.g., human resources) (11)	○ Public relations and marketing (12)
Second Area (2)	○ Fundraising (9)	○ Governing board relations (10)	○ Personal issues (e.g., human resources) (11)	○ Public relations and marketing (12)
Third Area (3)	○ Fundraising (9)	○ governing board relations (10)	○ Personal issues (e.g., human resources) (11)	○ Public relations and marketing (12)

First Area (1)	○ Strategic planning (13)	○ Workforce and economic development (14)	○ Student success (e.g., retention, completion, etc.) (15)	○ Performance-based funding (16)
Second Area (2)	○ Strategic planning (13)	○ Workforce and economic development (14)	○ Student success (e.g., retention, completion, etc.) (15)	○ Performance-based funding (16)
Third Area (3)	○ Strategic planning (13)	○ Workforce and economic development (14)	○ Student success (e.g., retention, completion, etc.) (15)	○ Performance-based funding (16)

Q23 Based on the following scale and definition of transformational leadership, rate yourself within the five characteristics in promoting DDDM:

Transformational Leader: The transformational leader must have or gain the ability to link change to a collective purpose that acknowledges needs, values, and goals of the group and at the same time, fully engages followers. The vision is shared by everyone throughout the organization and both the leader and followers work collaboratively to transform and create new culture.

	low (1)	medium low (2)	medium (3)	medium high (4)	high (5)
Vision: while shared by others, the vision is primary responsible for the transformational leader (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Influence Orientation: the process of shared governance results in increased delegation, empowerment, and self-actualization of both leaders and followers (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People Orientation: the process of leader and follower interaction where strengths of each team member are maximized and there exists a strong focus on the individual (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Motivational Orientation: the process whereby followers are motivated to achieve and are excited through performance and results (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Values Orientation: the process whereby a leader models ethical fiber of commitment, quality, integrity, trust, and respect. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Q24 SECTION 3 – AACC Leadership Competencies

The next questions addressed are the five competency domains for the community college leaders that have been developed and endorsed by the American Association of Community Colleges (AACC). For each component listed, please rate how well prepared you were coming into your first leadership position.

**Organizational Strategy** – An effective community college leader promotes the success of all students, strategically improves the quality of the institution, and sustains the community college mission based on knowledge of the organization, its environment, and future trends

Not prepared (1)	Weakly prepared (2)	Somewhat prepared (3)	Prepared (4)	Strongly prepared (5)
Develop, implement, and evaluate strategies to improve the quality of education at your institution (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use data-driven decision making practices to plan strategically (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use a systems perspective to assess and respond to the needs of Students and the community (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop a positive environment that supports innovation, teamwork, and successful outcomes (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintain and grow college personnel, fiscal resources, and assets (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Align organizational mission, structures, and resources with the college master plan (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q25 Institutional Finance, Research, Fundraising, and Resource Management**

An effective community college leader equitably and ethically sustains people, processes, and information as well as physical and financial assets to fulfill the mission, vision, and goals of the community college.

Not prepared (1)	Weakly prepared (2)	Somewhat prepared (3)	Prepared (4)	Strongly prepared (5)
Ensure accountability in reporting (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support operational decisions by managing information resources (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop and manage resources consistent with the college master plan (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take an entrepreneurial stance in seeking ethical alternative funding sources (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implement financial strategies to support programs, services, staff and facilities (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implement a human resources system that fosters the professional development and advancement of all staff (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employ organizational, time management, planning, and delegation skills (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



## Q26 Communication

An effective community college leader uses clear listening, speaking, and writing skills to engage in honest, open dialogue at all levels of the college and its surrounding community; promotes the success of all students; ensures the safety and security of students and the surrounding college community; and sustains the community college mission.

Not prepared (1)	Weakly prepared (2)	Somewhat prepared (3)	Prepared (4)	Strongly prepared (5)
Articulate and champion shared mission, vision, and values to internal and external audiences (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disseminate and support policies and strategies (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create and maintain open communication regarding resources, priorities, and expectations (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectively convey ideas and information to all constituents (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Listen actively to understand, analyze, engage, and act (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project confidence and respond responsibly and tactfully (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Q27 Collaboration

An effective community college leader develops and maintains responsive, cooperative, mutually beneficial, and ethical internal and external relationships that nurture diversity, promotes the success of all students, and sustains the community college mission.

Not prepared (1)	Weakly prepared (2)	Somewhat prepared (3)	Prepared (4)	Strongly prepared (5)
Embrace and employ the diversity of individuals, cultures, values, ideas, and communication styles (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstrate cultural competence in a global society (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involve students, faculty, staff, and community members to work for the common good (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Establish networks and partnerships to advance the mission of the community college (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work effectively and diplomatically with legislators, board members, business leaders, accreditation organizations, and others (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manage conflict and change by building and maintaining productive relationships (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop, enhance, and sustain teamwork and cooperation (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitate shared problems solving and decision-making (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Q28 Community College Advocacy

An effective community college leader understands, commits to, and advocates for the mission, vision, and goals of the community college on the local, state, and national level.

Not prepared (1)	Weakly prepared (2)	Somewhat prepared (3)	Prepared (4)	Strongly prepared (5)
Value and promote diversity, inclusion, equity, and Academic excellence (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstrate commitment to the mission of community colleges and student success through the scholarship of teaching and learning (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promote equity, open access, teaching, learning, and innovation as primary goals for college (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advocate the community college mission to all constituents and empower them to do the same (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advance lifelong learning and support a learning-centered environment (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Represent the community college in a variety of settings as a model of higher education (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Q29 SECTION 4 – Demographics

Which of the following most closely corresponds to your primary work responsibilities?

- ☐ Administration (1)
- ☐ Faculty (2)
- ☐ Professional Staff (3)

Answer If SECTION 1 – Demographics Which of the following most closely corresponds to your primary work res... Administration Is Selected

## Q30 Administration

- ☐ Top Executive or Senior Institutional Officer (1)
- ☐ Academic Dean (2)
- ☐ Institutional Administrator (3)
- ☐ Head of Division, Department or Center (4)
- ☐ Academic Associate/Assistant Dean (5)
- ☐ Other (6)

Answer If SECTION 1 – Demographics Which of the following most closely corresponds to your primary work res... Faculty Is Selected

## Q31 Faculty

- ☐ Teacher/Instructor (1)
- ☐ Other (2)

Answer If Which of the following most closely corresponds to your primary work responsibilities? Professional Staff Is Selected

## Q32 Professional Staff

- ☐ Academic Affairs (Instruction, Library, Museums, etc) (1)
- ☐ Athletics (2)
- ☐ Extension Programs or Technology Transfer (3)
- ☐ Facilities (4)
- ☐ Fiscal Affairs (budget, purchasing, etc) (5)
- ☐ Health/Medical Services (6)
- ☐ Information Technology (7)
- ☐ Institutional Affairs (Human Resources, Institutional Research, etc) (8)
- ☐ Research (research scientists, lab coordination, etc) (9)
- ☐ Student Affairs (registrar, housing, counseling, etc) (10)
- ☐ Other (please specify) (11)

Q33 Number of years in your current position?

- ☐ 1 (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5 (5)
- ☐ 6 (6)
- ☐ 7 (7)
- ☐ 8 (8)
- ☐ 9 (9)
- ☐ 10 (10)
- ☐ 11 (11)
- ☐ 12 (12)
- ☐ 13 (13)
- ☐ 14 (14)
- ☐ 15 (15)
- ☐ 16 (16)
- ☐ 17 (17)
- ☐ 18 (18)
- ☐ 19 (19)
- ☐ 20 (20)
- ☐ 21 (21)
- ☐ 22 (22)
- ☐ 23 (23)
- ☐ 24 (24)
- ☐ 25 (25)
- ☐ 26 (26)
- ☐ 27 (27)
- ☐ 28 (28)
- ☐ 29 (29)
- ☐ 30+ (30)

## Q34 Age

- ☐ 18 (18)
- ☐ 19 (19)
- ☐ 20 (20)
- ☐ 21 (21)
- ☐ 22 (22)
- ☐ 23 (23)
- ☐ 24 (24)
- ☐ 25 (25)
- ☐ 26 (26)
- ☐ 27 (27)
- ☐ 28 (28)
- ☐ 29 (29)
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- ☐ 37 (37)
- ☐ 38 (38)
- ☐ 39 (39)
- ☐ 40 (40)
- ☐ 41 (41)
- ☐ 42 (42)
- ☐ 43 (43)
- ☐ 44 (44)
- ☐ 45 (45)
- ☐ 46 (46)
- ☐ 47 (47)
- ☐ 48 (48)
- ☐ 49 (49)
- ☐ 50 (50)
- ☐ 51 (51)
- ☐ 52 (52)
- ☐ 53 (53)
- ☐ 54 (54)
- ☐ 55 (55)
- ☐ 56 (56)
- ☐ 57 (57)
- ☐ 58 (58)

- ☐ 59 (59)
- ☐ 60 (60)
- ☐ 61 (61)
- ☐ 62 (62)
- ☐ 63 (63)
- ☐ 64 (64)
- ☐ 65 (65)
- ☐ 66 (66)
- ☐ 67 (67)
- ☐ 68 (68)
- ☐ 69 (69)
- ☐ 70+ (70)

Q35 Race/Ethnicity

- ☐ Non-resident alien (1)
- ☐ Race and ethnicity unknown (2)
- ☐ Hispanics of any race (3)
- ☐ American Indian or Alaskan Native (4)
- ☐ Asian (5)
- ☐ Black or African American (6)
- ☐ Native Hawaiian or Other Pacific Islander (7)
- ☐ White (8)
- ☐ 2 or more (9)

Q36 What was your previous position/job prior to your current position?

- ☐ Administration (1)
- ☐ Faculty (2)
- ☐ Professional Staff (3)

Answer If What was your previous position/job prior to your current position? Administration Is Selected

Q37 Which type of administration position/job did you have prior to your current position?

- ☐ Top Executive or Senior Institutional Officer (1)
- ☐ Academic Dean (2)
- ☐ Institutional Administrator (3)
- ☐ Head of Division, Department or Center (4)
- ☐ Academic Associate/Assistant Dean (5)
- ☐ Other, please specify (6) \_\_\_\_\_

Answer if Faculty is selected...

Q38 What type of faculty position/job did you have prior to your current position?

- ☐ Teacher/Instructor (1)
- ☐ Other, please specify (2) \_\_\_\_\_

Answer if Professional Staff is selected...

Q39 What type of professional staff position/job did you have prior to your current position?

- ☐ Academic Affairs (Instruction, Library, Museums, etc) (1)
- ☐ Athletics (2)
- ☐ Extension Programs or Technology Transfer (3)
- ☐ Facilities (4)
- ☐ Fiscal Affairs (budget, purchasing, etc) (5)
- ☐ Health/Medical Services (6)
- ☐ Information Technology (7)
- ☐ Institutional Affairs (Human Resources, Institutional Research, etc) (8)
- ☐ Research (research scientists, lab coordination, etc) (9)
- ☐ Student Affairs (registrar, housing, counseling, etc) (10)
- ☐ Business Professional (11)
- ☐ Medical Professional (12)
- ☐ Other, please specify (13) \_\_\_\_\_

Q40 How many years did you hold your previous position/job?

- ☐ 1 (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5 (5)
- ☐ 6 (6)
- ☐ 7 (7)
- ☐ 8 (8)
- ☐ 9 (9)
- ☐ 10 (10)
- ☐ 11 (11)
- ☐ 12 (12)
- ☐ 13 (13)
- ☐ 14 (14)
- ☐ 15 (15)
- ☐ 16 (16)
- ☐ 17 (17)
- ☐ 18 (18)
- ☐ 19 (19)
- ☐ 20 (20)
- ☐ 21 (21)
- ☐ 22 (22)



- ☐ 23 (23)
- ☐ 24 (24)
- ☐ 25 (25)
- ☐ 26 (26)
- ☐ 27 (27)
- ☐ 28 (28)
- ☐ 29 (29)
- ☐ 30+ (30)

Q41 What is your highest degree earned?

- ☐ Associate of Arts/Associate of Applied Sciences (1)
- ☐ Bachelor's (2)
- ☐ Master's (3)
- ☐ Ed. Specialist (4)
- ☐ Ph.D. (5)
- ☐ Ed.D. (6)
- ☐ J.D. (7)
- ☐ Other, please specify (8) \_\_\_\_\_

Q43 What was your major field of study in your highest degree?

- ☐ Business Management/Administration (1)
- ☐ Communication (2)
- ☐ Computer and Information Sciences (3)
- ☐ Educational Research (4)
- ☐ Educational Administration (5)
- ☐ Teacher Education (6)
- ☐ Other Education (7)
- ☐ Engineering (8)
- ☐ Humanities (9)
- ☐ Agricultural Science (10)
- ☐ Natural Resources (11)
- ☐ Biological/Biomedical Sciences (12)
- ☐ Health Sciences (13)
- ☐ Law (14)
- ☐ Mathematics (15)
- ☐ Physical Sciences (16)
- ☐ Psychology (17)
- ☐ Social Sciences (18)
- ☐ Other, please specify (19) \_\_\_\_\_

Q44 May we contact you to obtain clarification or further insight into some of your responses?

- ☐ Yes (1)
- ☐ No (2)

Q45 Thank you for your time. We appreciate your assistance!

## **APPENDIX B: DDDM FINAL SURVEY**

### **Q1 Survey of Community College Data Driven Decision Making Summer 2016**

Thank you for participating in the Survey of Community College Data Driven Decision Making (DDDM). This survey was developed by a research team in the Community College Leadership Program in the School of Education at Iowa State University. Using the 2012 and 2015 EDUCAUSE Analytics Survey, the Learning Analytics Readiness Instrument (LARI), and the President's Survey Tool, the constructs of the research that this newly developed instrument are vetted in is the 2nd Edition of the American Association of Community Colleges (AACC) Competencies for Community College Leaders. These constructs include organizational strategy, institutional finance, research, fundraising, and resource management, communication, collaboration, and community college advocacy. The researchers will use these constructs as a guide to examine data analytics and data driven decision making level at the community college. Specifically, we will take a look at how data usage is affected by leadership and how it affects infrastructure and student outcomes.

There are four sections in this survey. Please read the instructions in each of these sections and respond to questions carefully. We estimate it will take approximately 10- 15 minutes to complete the survey.

Please note that your personal identifiers (e.g., names, emails, etc.) will be kept confidential. Your responses will not be provided to anyone in your college. Your answers will be analyzed as part of an aggregated data set.

The DDDM Research Team Marvin Dejean, Brett Monaghan, Matt Schmit Doctoral Students School of Education Iowa State University

## Q2 SECTION 1 – Demographics

Which of the following most closely corresponds to your primary work responsibilities?

- ☐ Administration (1)
- ☐ Faculty (2)
- ☐ Professional Staff (3)

Answer If SECTION 1 – Demographics Which of the following most closely corresponds to your primary work res... Administration Is Selected

## Q3 Administration

- ☐ Top Executive or Senior Institutional Officer (1)
- ☐ Academic Dean (2)
- ☐ Institutional Administrator (3)
- ☐ Head of Division, Department, or Center (4)
- ☐ Academic Associate/Assistant Dean (5)
- ☐ Other (6)

Answer If SECTION 1 – Demographics Which of the following most closely corresponds to your primary work res... Faculty Is Selected

## Q4 Faculty

- ☐ Teacher/Instructor (1)
- ☐ Other (2)

Answer If Which of the following most closely corresponds to your primary work responsibilities? Professional Staff Is Selected

## Q5 Professional Staff

- ☐ Academic Affairs (instruction, library, museums, etc) (1)
- ☐ Athletics (2)
- ☐ Extension Programs or Technology Transfer (3)
- ☐ Facilities (4)
- ☐ Fiscal Affairs (budget, purchasing, etc) (5)
- ☐ Health/Medical Services (6)
- ☐ Information Technology (7)
- ☐ Institutional Affairs (human resources, institutional research, etc) (8)
- ☐ Research (research scientists, lab coordination, etc) (9)
- ☐ Student Affairs (registrar, housing, counseling, etc) (10)
- ☐ Other (please specify) (11)

Q6 Number of years in your current position?

- ☐ 1 (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5 (5)
- ☐ 6 (6)
- ☐ 7 (7)
- ☐ 8 (8)
- ☐ 9 (9)
- ☐ 10 (10)
- ☐ 11 (11)
- ☐ 12 (12)
- ☐ 13 (13)
- ☐ 14 (14)
- ☐ 15 (15)
- ☐ 16 (16)
- ☐ 17 (17)
- ☐ 18 (18)
- ☐ 19 (19)
- ☐ 20 (20)
- ☐ 21 (21)
- ☐ 22 (22)
- ☐ 23 (23)
- ☐ 24 (24)
- ☐ 25 (25)
- ☐ 26 (26)
- ☐ 27 (27)
- ☐ 28 (28)
- ☐ 29 (29)
- ☐ 30+ (30)

## Q7 Age

- ☐ 18 (18)
- ☐ 19 (19)
- ☐ 20 (20)
- ☐ 21 (21)
- ☐ 22 (22)
- ☐ 23 (23)
- ☐ 24 (24)
- ☐ 25 (25)
- ☐ 26 (26)
- ☐ 27 (27)
- ☐ 28 (28)
- ☐ 29 (29)
- ☐ 30 (30)
- ☐ 31 (31)
- ☐ 32 (32)
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- ☐ 35 (35)
- ☐ 36 (36)
- ☐ 37 (37)
- ☐ 38 (38)
- ☐ 39 (39)
- ☐ 40 (40)
- ☐ 41 (41)
- ☐ 42 (42)
- ☐ 43 (43)
- ☐ 44 (44)
- ☐ 45 (45)
- ☐ 46 (46)
- ☐ 47 (47)
- ☐ 48 (48)
- ☐ 49 (49)
- ☐ 50 (50)
- ☐ 51 (51)
- ☐ 52 (52)
- ☐ 53 (53)
- ☐ 54 (54)
- ☐ 55 (55)
- ☐ 56 (56)
- ☐ 57 (57)
- ☐ 58 (58)

- ☐ 59 (59)
- ☐ 60 (60)
- ☐ 61 (61)
- ☐ 62 (62)
- ☐ 63 (63)
- ☐ 64 (64)
- ☐ 65 (65)
- ☐ 66 (66)
- ☐ 67 (67)
- ☐ 68 (68)
- ☐ 69 (69)
- ☐ 70+ (70)

Q8 Gender

- ☐ Male (1)
- ☐ Female (2)

Q9 Race/Ethnicity

- ☐ Non-resident alien (1)
- ☐ Race and ethnicity unknown (2)
- ☐ Hispanics of any race (3)
- ☐ American Indian or Alaskan Native (4)
- ☐ Asian (5)
- ☐ Black or African American (6)
- ☐ Native Hawaiian or Other Pacific Islander (7)
- ☐ White (8)
- ☐ 2 or more (9)

Q10 What is your highest degree earned?

- ☐ Associate of Arts/Associate of Applied Sciences (1)
- ☐ Bachelor's (2)
- ☐ Master's (3)
- ☐ Ed. Specialist (4)
- ☐ Ph.D. (5)
- ☐ Ed.D. (6)
- ☐ J.D. (7)
- ☐ Other (please specify) (8) \_\_\_\_\_

Q11 What was your major field of study in your highest degree?

- ☐ Business Management/Administration (1)
- ☐ Communication (2)
- ☐ Educational Administration (5)
- ☐ Teacher Education (6)
- ☐ Other Education (7)
- ☐ Other (please specify) (19) \_\_\_\_\_

Q12 SECTION 2 - Data Driven Decision Making

How would you rate your personal involvement with the Data Driven Decision Making (DDDM) effort/discussion at your institution?

Not at all (1)

Interested, but not involved (2)

Somewhat involved (3)

Highly involved (4)

Leading the conversation (5)

Q13 Select the response that best describes the degree of involvement that each of the following positions have at your institution in regards to the use of DDDM.

Not currently involved in analytics (1)		Support/Contributor Role (2)	Leadership/Sponsor Role (3)	Don't know (4)	Don't have this position (5)
President/Chancellor (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Academic Officer or Provost (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Learning Officer or Equivalent (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Success Leader (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Information Officer or Equivalent (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Data Officer or Equivalent (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Director of Institutional Research (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Analytics Officer or Equivalent (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chief Financial Officer or Chief Business Officer (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Q14 What priority does your institution place on the use of DDDM?

- ☐ Major institutional priority (1)
- ☐ Major priority for some departments, units, or programs, but not for the entire institution (2)
- ☐ An interest of the institution, but not a priority (3)
- ☐ Intentionally not a priority or interest (4)
- ☐ Little awareness, and therefore not a priority of interest (5)
- ☐ Don't know (6)

Q15 Governance/Infrastructure

Please rate your agreement with the following statements:

Strongly disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
My institution views the use of data as a long term investment, rather than a short term expense (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has measurable objectives that will indicate if success has been achieved (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has developed interventions to implement with appropriately identified students (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has well defined goals for the implementation of use of data (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People from multiple offices across my institution are involved in the effort (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has the ability to store and manage increasingly large volumes of data (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q16 The following questions ask about professionals with various skills and abilities. Please consider any individual employed by your institution (e.g. staff, faculty, etc) when answering these questions.

Strongly disagree (1)		Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
My institution has professionals who know how to use and apply data to their areas (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has professionals who have specialized training in data- use (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has a sufficient number of professionals who are able to provide support in the use of data (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institutional researcher knows how to present data/reports in ways that are visually intuitive and easily understood (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has professionals who train diverse constituents on the use of new and existing data systems (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



renewal) (5)								
Alumni/Development (e.g., membership, contribution history, employment data, transfer data, relocation information) (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning/Management System/Course Management System (e.g., user log data, assignment grades) (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Q18 At my institution:

Strongly disagree (1)		Disagree (2)	Neither Agree nor Disagree (4)	Agree (5)	Strongly Agree (6)
Institutional reports routinely inform institutional decisions (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is an established routine process for eliminating or phasing out unused institutional reports (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Persons attempting to replicate reports/data can do so regularly (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Institutional reports routinely inform departmental decisions (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Institutional reports routinely contain trustworthy data (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are routine scripts/processes for refreshing/updating institutional reports (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q19 Culture and Process. Please rate your agreement with the following statements regarding conversations about data, decision making, and student success on your campus:

Strongly disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
My institution is ready to put resources behind the research necessary to implement DDDM (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution's administrators generally accept the use of data for decision making (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has had conversations regarding the sustainability of DDDM effort (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has a clear vision of where it can make changes to help students be more successful academically (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has a culture that accepts the use of data to make decisions (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution's faculty largely accept the use of DDDM for improving teaching and learning (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My institution has shared the definition of "student success" with faculty, staff, and students alike (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q20 Provide your best estimate of how data are being used in various functional areas of your institution. Select all that apply:

We do not collect usable data (1)	Data are collected, but are never or rarely used (2)	We create and use analyses or reports to monitor operations or programs (3)	We create and use analyses or reports to make projections for programs or groups (4)	We create and use predictive analyses or reports that may trigger proactive responses (5)	
Student Learning (real-time or on-demand assessment and feedback) (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Learning (learning outcomes, course completion) (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Degree Planning (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Progress (retention, graduation, etc) (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enrollment management, admissions, and recruiting (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost to complete degree (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q21 At my institution, I would describe the communication about data (either raw data or in report form) as:

- ☐ Highly decentralized: Data/reports shared in small groups within departments and selected individuals available with permission (1)
- ☐ Mostly decentralized: Data/reports shared within departments and selected individuals available if you know who to ask (2)
- ☐ Level: Nearly all data/reports shared across the institution and broadly available (3)
- ☐ Mostly centralized: Data/reports controlled by central administration or IT, but most made broadly available (4)
- ☐ Highly centralized: Data/reports controlled by central administration or IT available at their discretion (5)

Q22 In what ways have you participated in internal programs that have contributed to the development of your DDDM competencies in your current position?

Departmental (1)

Campus-wide (2)

District level (3)

Q23 Who has influenced your DDDM skills the most?

A supervisor (1)

Co-workers (2)

External constituents/partners (3)

Professional relationships (4)

Academic advisor/mentor (5)

Academic peers (6)

Q24 Based on the following scale and definition of transformational leadership, rate yourself within the five characteristics in promoting DDDM: Transformational Leader - The transformational leader must have or gain the ability to link change to a collective purpose that acknowledges needs, values, and goals of the group and at the same time, fully engages followers. The vision is shared by everyone throughout the organization and both the leader and followers work collaboratively to transform and create new culture.

	Low (1)	Medium low (2)	Medium (3)	Medium high (4)	High (5)
Vision: while shared by others, the vision is primarily responsible for the transformational leader (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Influence Orientation: the process of shared governance results in increased delegation, empowerment, and self-actualization of both leaders and followers (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People Orientation: the process of leader and follower interaction where strengths of each team member are maximized and there exists a strong focus on the individual (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Motivational Orientation: the process whereby followers are motivated to achieve and are excited through performance and results (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Values Orientation: the process whereby a leader models ethical fiber of commitment, quality, integrity, trust, and respect. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



#### Q25 SECTION 4 – AACC Leadership Competencies

The next questions addressed are the five competency domains for the community college leaders that have been developed and endorsed by the American Association of Community Colleges (AACC). For each component listed, please rate how well prepared you were coming into your first leadership position.

**Organizational Strategy** An effective community college leader promotes the success of all students, strategically improves the quality of the institution, and sustains the community college mission based on knowledge of the organization, its environment, and future trends.

Not prepared (1)	Weakly prepared (2)	Somewhat prepared (3)	Prepared (4)	Strongly prepared (5)
Develop, implement, and evaluate strategies to improve the quality of education at your institution (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use data-driven decision making practices to plan strategically (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use a systems perspective to assess and respond to the needs of students and the community (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop a positive environment that supports innovation, teamwork, and successful outcomes (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintain and grow college personnel, fiscal resources, and assets (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Align organizational mission, structures, and resources with the college master plan (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q26 Institutional Finance, Research, Fundraising, and Resource Management**

An effective community college leader equitably and ethically sustains people, processes, and information as well as physical and financial assets to fulfill the mission, vision, and goals of the community college.

Not prepared (1)	Weakly prepared (2)	Somewhat prepared (3)	Prepared (4)	Strongly prepared (5)
Ensure accountability in reporting (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support operational decisions by managing information resources (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop and manage resources consistent with the college master plan (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take an entrepreneurial stance in seeking ethical alternative funding sources (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implement financial strategies to support programs, services, staff and facilities (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implement a human resources system that fosters the professional development and advancement of all staff (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employ organizational, time management, planning, and delegation skills (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Q27 Communication

An effective community college leader uses clear listening, speaking, and writing skills to engage in honest, open dialogue at all levels of the college and its surrounding community; promotes the success of all students; ensures the safety and security of students and the surrounding college community; and sustains the community college mission.

Not prepared (1)		Weakly prepared (2)	Somewhat prepared (3)	Prepared (4)	Strongly prepared (5)
Articulate and champion shared mission, vision, and values to internal and external audiences (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disseminate and support policies and strategies (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create and maintain open communication regarding resources, priorities, and expectations (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectively convey ideas and information to all constituents (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Listen actively to understand, analyze, engage, and act (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project confidence and respond responsibly and tactfully (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Q28 Collaboration

An effective community college leader develops and maintains responsive, cooperative, mutually beneficial, and ethical internal and external relationships that nurture diversity, promotes the success of all students, and sustains the community college mission.

Not prepared (1)	Weakly prepared (2)	Somewhat prepared (3)	Prepared (4)	Strongly prepared (5)
Embrace and employ the diversity of individuals, cultures, values, ideas, and communication styles (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstrate cultural competence in a global society (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involve students, faculty, staff, and community members to work for the common good (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Establish networks and partnerships to advance the mission of the community college (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work effectively and diplomatically with legislators, board members, business leaders, accreditation organizations, and others (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manage conflict and change by building and maintaining productive relationships (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop, enhance, and sustain teamwork and cooperation (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitate shared problems solving and decision-making (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Q29 Community College Advocacy

An effective community college leader understands, commits to, and advocates for the mission, vision, and goals of the community college on the local, state, and national level.

Not prepared (1)	Weakly prepared (2)	Somewhat prepared (3)	Prepared (4)	Strongly prepared (5)
Value and promote diversity, inclusion, equity, and academic excellence (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstrate commitment to the mission of community colleges and student success through the scholarship of teaching and learning (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promote equity, open access, teaching, learning, and innovation as primary goals for college (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advocate the community college mission to all constituents and empower them to do the same (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advance lifelong learning and support a learning-centered environment (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Represent the community college in a variety of settings as a model of higher education (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q30 May we contact you to obtain clarification or further insight into some of your responses?

- ☐ Yes (1)
- ☐ No (2)

Q31 Thank you for your time. We appreciate your assistance!

## APPENDIX C: INSTITUTIONAL REVIEW BOARD EXEMPTION

**IOWA STATE UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

Institutional Review Board  
Office for Responsible Research  
Vice President for Research  
1138 Pearson Hall  
Ames, Iowa 50011-2207  
515 294-4566  
FAX 515 294-4267

**Date:** 9/28/2015

**To:** Brett Monaghan  
2003 S 16th Street  
Centerville, IA 52544

**CC:** Dr. Soko Starobin  
N221A Lagomarcino  
Yu Chen  
N216 Lagomarcino

**From:** Office for Responsible Research

**Title:** Survey of Community College Data Driven Decision Making

**IRB ID:** 15-523

**Study Review Date:** 9/25/2015

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where
  - Information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects; or
  - Any disclosure of the human subjects' responses outside the research could not reasonably place the subject at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

The determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**
- **You must carry out the research as described in the IRB application.** Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

**Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form.** A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Humans Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. **Only the IRB or designees may make the determination of exemption**, even if you conduct a study in the future that is exactly like this study.

Please be aware that **approval from other entities may also be needed**. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.**